

**LOGISTICS MANAGEMENT PRACTICES AND
PERFORMANCE OF ELECTORAL SYSTEMS IN
KENYA**

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**DOCTOR OF PHILOSOPHY IN
SUPPLY CHAIN MANAGEMENT**

**JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY**

2026

**Logistics Management Practices and Performance of Electoral
Systems in Kenya**

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**A Thesis Submitted in Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy in Supply Chain Management of
the Jomo Kenyatta University of Agriculture and Technology**

2026

DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

I wish dedicate this research thesis to my family particularly my mother Margreat Okecha and Late Dad, Mr. Joel Odongo Sei for their love, support patience, understanding, encouragement, and support during the study period.

ACKNOWLEDGEMENT

I am deeply indebted to Dr. Jackson Ndolo and Dr. Sammy Odari as my guide from Jomo Kenyatta University of Agriculture and Technology. Throughout the writing of this thesis, they have been instrumental in giving me direction. Over all this time, Dr. Eric Namusonge, Dr. Alice Simiyu, Dr. Wilberforce Senelwa and Dr. Elizabeth Wachiuri were great teachers, peers, and friends. In particular, I am grateful for the support of my family and friends throughout this special pursuit. Their unwavering support, encouragement and understanding throughout this process has kept me working towards my goal.

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ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence
ANOVA	Analysis of Variance
BVD	Biometric Verification Device(s)
BVR	Biometric Voter Registration
CEO	Chief Executive Officer
CMD	Centre for Multiparty Democracy (CMD-Kenya)
CPFR	Collaborative Planning, Forecasting and Replenishment
CPTED	Crime Prevention Through Environmental Design
CS	Commission Secretary
CSR	Corporate Social Responsibility
CVI	Content Validity Index
DCS	Deputy Commission Secretary
DRC	Democratic Republic of Congo
DW	Durbin-Watson (statistic)
EC	Electoral Commission — used for both Ghana and Uganda
ECI	Election Commission of India
EMB	Electoral Management Body
EOQ	Economic Order Quantity
EPR	Extended Producer Responsibility
ERP	Enterprise Resource Planning
EVID	Electronic Voter Identification Device
EVM	Electronic Voting Machine
GPS	Global Positioning System
ICT	Information and Communication Technology
IDEA	International Institute for Democracy and Electoral Assistance
IEBC	Independent Electoral and Boundaries Commission
IEC	Independent Electoral Commission
IFES	International Foundation for Electoral Systems
IMP	Inventory Management Practices
INEC	Independent National Electoral Commission

IT	Information Technology
JIT	Just-In-Time
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KCAU	KCA University
KMO	Kaiser-Meyer-Olkin (measure of sampling adequacy)
LC	Logistics Communication
LPP	Logistics Planning Practices
MMR	Moderated Multiple Regression
NACOSTI	National Commission for Science, Technology and Innovation
NEBE	National Electoral Board of Ethiopia
NEC	National Electoral Commission
NTC	National Transitional Council
OLS	Ordinary Least Squares
PVC	Permanent Voter Card
Q-Q	Quantile-Quantile (plot)
RBM	Result-Based Management
RBV	Resource-Based View (theory)
RFID	Radio Frequency Identification
SA	Strongly Agree
SAQ	Self-Administered Questionnaire
SD	Strongly Disagree"
SPSS	Statistical Package for Social Sciences
SRMF	Security Risk Management Framework
SS	Sum of Squares
SSM	Soft Systems Methodology
TCE	Transaction Cost Economics
TM	Transportation Management
UAS	Unmanned Aircraft Systems
UK	United Kingdom
UNDP	United Nations Development Programme
US/USA	United States (of America)
VIF	Variance Inflation Factor

DEFINITION OF OPERATIONAL TERMS

Election	A systematic group decision-making mechanism by which a society decides who to hold public office for a person or several individuals. (Hyde, & Marinov, 2013)
Election Performance	The act of confirming the final official election results of the jurisdiction. This case takes place after the votes of valid ballots are counted by all sources (election day, postal vote, early vote, interim ballots, etc.) and the results are checked and approved by those lawfully liable. (Hyde, & Marinov, 2012)
Logistics	The process of planning, implementing, and controlling the efficient and effective flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customer requirements. (CIPS 2026)
Logistics Management	The component of supply chain management responsible for planning, implementing, and controlling the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption to satisfy customer requirements. (CIPS 2026)
Logistics planning practices:	These are engaged to ensure that the systems and infrastructure are suitable and necessary in any way to fulfill the near future needs of enterprise, administration, scheduling of supply and control. It's an attempt to 'future proof' of the logistic function of institutions in unstable and volatile times (Hidayat, Putra, Sintiya, Guswanti, & Sihotang, 2020).

Inventory management practices:	A comprehensive approach to the procurement, storage and distribution of inventories both raw materials (components) and finished goods (products). Inventory management means the right stock, at the right level, at the right position, at the right time and at the right cost as well as at the right price (Pane, Awangga, Nuraini, & Fathonah, 2018).
Transportation management practices:	is the activity of taking goods or people from one place to another in a vehicle (Pane, Awangga, Nuraini, & Fathonah, 2018).
Logistics Communication:	Seamless exchange of critical information across a supply chain to coordinate the movement, storage, and delivery of goods (Sihotang, 2020).
Election Law	Refer to a set of rules and regulations that govern the conduct and administration of elections. These laws are designed to ensure the integrity, fairness, and transparency of the electoral process (Sihotang, 2020).
Election System	A structured process through which a population selects individuals to hold public office. The system encompasses various stages including voter registration, ballot casting, vote counting, and result verification, all governed by a legal and regulatory framework designed to ensure fairness, transparency, and security
Constitution of Kenya	The supreme law of the Republic of Kenya. It was promulgated on August 27, 2010, following a referendum held on August 4, 2010. This constitution replaced the earlier constitution that had been in place since Kenya's independence from Britain in 1963

ABSTRACT

Elections are the bedrock of democracy, and their credibility depends substantially on the quality of the logistics that deliver them. In Kenya, the performance of the electoral system has persistently fallen short of constitutional and public expectations: the 2017 presidential election was nullified by the Supreme Court, rejected ballots exceeded 100,000 in both the 2013 and 2022 General Elections, and the Commission's own evaluations attribute recurring failures to disjointed logistics across procurement, warehousing, transportation and results transmission. This study therefore sought to determine the relationship between logistics management practices and the performance of electoral systems in Kenya, guided by five specific objectives covering logistics planning practices, inventory management practices, transportation management practices, logistics communication, and the moderating role of election laws. The study adopted a mixed methods research design underpinned by a pragmatist philosophy. The target population comprised 373 officials, namely the Commission Secretary/Chief Executive Officer, Deputy Commission Secretary, Directors, Managers, County Election Managers and Constituency Election Coordinators across the 290 constituencies of Kenya's August 2022 General Election, from which a sample of 190 respondents was drawn using stratified random sampling. Primary data were collected through structured questionnaires and an interview guide, while secondary data were obtained through documentary analysis of IEBC evaluation reports, Election Operation Plans and Supreme Court election petition judgments. Quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS) version 28 and qualitative data using MAXQDA. Reliability testing returned Cronbach's alpha coefficients at or above the accepted 0.70 threshold for all scales, with a standardized-item alpha of 0.701 for inventory management practices and coefficients of between 0.784 and 0.895 for the remaining variables, thus indicating adequate convergence and internal consistency. Multiple regression and correlation analysis were carried out. The results show that performance of election systems in Kenya was positively correlated with Logistics planning practices, Inventory management practices, Transportation management practices, and logistics communication with the inclusion of election laws as moderator. The study concluded that the performance of electoral systems in Kenya improves with strengthened logistics planning, inventory management, transportation management and logistics communication, and that the influence of election laws operates largely through, rather than independently of, these practices. The study recommended that the organization responsible for elections in Kenya should enhance the allocation of resources and reduce delays through effective logistics planning; safeguard the integrity of election materials through digitized inventory tracking and regular inspection to detect and prevent defects; implement efficient and economical transportation strategies that uphold quality standards and minimize costs; and develop and deploy adaptable communication systems capable of responding effectively to emergency situations ahead of the 2027 General Election.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Successful elections have strengthened democratic practices and institutions in some African countries, while improving economic growth opportunities. After periods of civil war and armed conflict, elections have opened doors for national reconciliation in other African countries (Dundas, 2011; Gyimah-Boadi, 2015; Lindberg, 2006). Faulty elections, however, have sparked violence in many African nations, catalyzed the notion of divided societies, and reduced public confidence in electoral and political processes (Cheeseman, 2018; Strauss & Taylor, 2009). The significance of elections cannot be sufficiently stressed in the democratization of African countries (Adetunji, 2015; Posner & Young, 2007).

Africa's democratization process is still an ongoing experiment and success is important for the future of the continent. However, it is difficult to separate the economy from the political system. The electoral process is at the heart of a successful democratic process, because it is an appropriate model of representation. According to Susan (2003), the constitutional provisions, the electoral legislation, the regulations as well as the policies and the administrative framework of the electoral management body all govern the means by which the elections are conducted. Providing an opportunity for all eligible voters to choose their government representatives through cost-effective, credible, and secure operations is a major challenge for electoral management bodies (Elklit & Reynolds, 2002; Norris, 2012). Efficient logistics management is a key component of the successful election (Adetunji, 2015).

However, assuming that, at existing, wholesale transfers can be made to Africa in Europe and the United States is unrealistic. For many of its countries, but not in most first-world countries, Africa continues to face a series of challenges. An objective and scientific framework for measuring performance and constant improvements in electoral logistics, which is contextualized in the African environment, is therefore

needed. The challenges faced by African countries, not as common in European countries, include: low to medium levels of social literacy, inadequate infrastructure to support electoral processes and the effects on elections and electoral processes of chronic and pervasive poverty (Elklit & Reynolds, 2002; Gyimah-Boadi, 2015; Norris, 2012).

Logistics management practices in an election consists of logistics communication, financial resources, packing products, warehouses, transport and communications. Some fixed capital is for constructing such infrastructures. They are concrete pillars and basements throughout logistics frameworks. In Election the logistics Infrastructure is responsible for making decisions for electoral bill of materials for all electoral activities, procurement, specifications and disposal of products that are approved in terms of warehousing, bill of materials, delivery of electoral materials and facilities, local infrastructure and voting stations (Ansell & Gash, 2008; Elklit & Reynolds, 2002).

There are many other flavors of logistics infrastructure for elections, both from a technology viewpoint and a process perspective. This is valid well beyond all the numerous forms of voting capture and tabulation machines. Several scholars have extensively researched the democratic process, and virtually all electoral processes have many basic components common to them. The owners of different facets of the architecture which vary in some countries, but the specifics of the kinds of structures used to execute the job are normally the same. For that cause, IT protection best practices would closely match those of the best practices aligned with such programs. These essential procedures should be recognized by those responsible for election infrastructure and the parts where they have jurisdiction should be defined.

According to the 2017 Supreme Court ruling in Kenya, significant logistics failures in the electronic transmission of results from polling stations to tallying centers affected the integrity of the election. The court found that the Independent Electoral and Boundaries Commission (IEBC) did not comply with constitutional and statutory provisions, which led to the nullification of the presidential election results. The court mandated a fresh presidential election within 60 days, highlighting the

importance of accurate and verifiable results (Africa Center for Strategic Studies, 2017).

Vote tabulation typically requires either logistics specialized hardware or software applications, but some dedicated hardware remains in use. Most vote capture systems use portable media to transmit voting data, though sometimes this data is transmitted over networks. Common methods of transmission include direct networks such as virtual private networks, local network connections, faxes, or phone calls (The East African, 2017).

The court noted that discrepancies between the electronically transmitted results and the physical forms raised significant issues. These discrepancies and the failure of the IEBC to follow proper procedures led to questions about the reliability of the election results. The ruling underscored the need for transparency and adherence to constitutional principles in conducting elections (Organization for World Peace, 2017).

Ultimately, the court's decision was based on substantial evidence of irregularities and non-compliance by the IEBC, which compromised the election's integrity. This historic ruling was seen as a significant moment for judicial independence and democracy in Kenya, setting a precedent for future elections (Africa Center for Strategic Studies, 2017).

Logistics management is often seen as the systematic, detailed process of planning, implementing and controlling the efficient, cost-effective flow and storage of materials and products and related information within a supply chain to meet the current and future demand, according to Christopher (1993). Logistics is the main operational support for elections, and this is one of the areas where there is little capacity in many African countries. In most African countries, this is due to the scarcity of necessary transportation management, inadequate logistics planning, inventory management and logistic communication. In African nations as a whole, there have also been attempts to conduct smooth, sustainable elections.

According to Chipfunde (2002) states that the election monitoring and observation process involves the "setting up of independent mission, officials or individuals representing international or local organizations for a specific period, in a country that is under way, in order to determine their managerial and administrative impartiality." The electoral logistics process is usually a short-term activity that includes voting, voting counting and declaring results. Van Cranenburgh, (2000) describes long-term observation as "observing the events that define the electoral logistics process from the setting up of electoral management bodies, voter registration, voter education, candidate nomination and political party registration, political campaigning and media issues, voting and the counting, through to the installation of elected bodies." From this definition of long-term observation, it is clear that there is a lack of long-term planning in African elections, and the current methods of evaluating electoral logistics, are based on short-term evaluations, which do not provide a full picture of the electoral process cycle, which then makes the legitimacy of the observations questionable.

Although election monitoring has been successful in identifying issues, no basic principles and theoretical principles have been developed that can be used to solve the problems identified which require long-term plans (Awopeju,2011). Election monitoring is an attempt at documented election performance management that does not address the core challenges faced by Africa countries elections, that is transportation management insufficient logistical planning, inventory management and logistic communication in most countries of Africa. It seeks to provide the necessary framework to measure logistical infrastructure performance and resources for supporting electoral processes in African countries, which are also necessary for long-term planning, but yet to be developed, of elections (Luo, & Rozenas, 2018).

1.1.1 Global Perspective on Logistics Management Practices and Performance of Electoral Systems

Robust logistics management practices help to constitute the performance of electoral systems. Logistics in this scheme can present a demonstrable impact on tasks ranging from voter registration, delivery of ballots, or general election-day

functionality (Vincent, Alihodzic, & Gale, 2021). Significant differences exist between the United States and European countries regarding logistics management in electoral systems (James & Garnett, 2022). Many researchers discern Asia due to differences in these regions' political and cultural milieus and institutional capacities (Wahman & Goldring, 2020; Lundstedt & Edgell, 2022).

The United States experiences unique logistical challenges caused by its vast geographical area and decentralized electoral system. In each of the states, there are different processes and technologies, making it a complex logistics network (Dahlström *et al.*, 2021). The mail-in ballots management in the 2020 presidential election showed how important logistics is (Persily & Stewart III, 2021). The pandemic resulted in an unprecedented increase in postal votes that needed to be handled by USPS securely and efficiently. This required meticulous planning for fast delivery, careful handling and accurate counting thus demonstrating how logistics can adapt to maintain fair elections during complex situations of this kind (Maley, 2020). Nevertheless, the major concern about the US electoral logistic system was that it had to secure voting especially with regard to hacking or negative influence as well as author's experience of voter manipulation (Vincent *et al.*, 2021; Foley, 2024).

In South America, Brazil has made great strides in electoral logistics through the adoption of digital voting machines. Brazil has used these machines throughout the country since 2000, reducing fraud and speeding up the counting process (Arceneaux, 2020). Nevertheless, deploying, maintaining and securing these machines across vast as well as often distant regions remains a major challenge for logistics. This logistical task is complicated by the need to ensure that all voting machine are functional, safely transported and sufficiently safeguarded from tempering through coordination which is meticulous and substantial resources (Ribeiro & Borges, 2020; Brasil, Capella, & Fagan, 2020).

However, the diverse political landscapes and different levels of development on the continent have led to greatly varied logistical challenges in electoral systems across Asia. For example, India's electoral system is one of the biggest and most complicated in the world. The enormity of India's geography coupled with its

diverse population and infrastructure variance creates enormous logistic challenges (Jensenius & Suryanarayan, 2022). In particular remote localities are reached by a well thought out logistics strategy implemented by India's Elections Commission. These include transportation of EVMs to polling stations which often necessitates innovative approaches like deploying animals such elephants or using boats in difficult terrains (Biswas, 2023). The coordination of logistics entails careful planning, training of election staff and security measures to ensure that the voting process is not tampered with (Khosla & Vaishnav, 2021; Fagernäs & Pelkonen, 2020).

Japan and South Korea which are examples of highly developed democratic nations that exemplify best practices in managing logistics during electoral processes for efficient interference technology (Cheng & Chu, 2017). Take for example Japan which is known for its technological might has incorporated advanced logistics and technology into its electoral processes. The country utilizes both paper ballots and electronic systems to achieve accuracy and transparency. Logistic management strategies have an emphasis on effective distribution and collection of ballots, result reporting in real-time as well ensuring a high level of security against fraud. Such a view by Tan (2020) underscores the importance of combining technological solutions with effective logistical planning to improve election performance. This indicates that while the individuals who reside in democracies characterized with maturity may enjoy proximity to where they can vote from plus adequate facilities, new Asian democracies may struggle to overcome logistical challenges, such as a lack of infrastructure and accessibility of remote regions (Singh & Roy, 2018; Langford, Schiel, & Wilson, 2021; Shin, 2011).

On the other hand, European countries often utilize more centralized voting systems, which can effectively simplify specific logistical administrative matters. The national electoral commissioners in Germany and France have the authority to supervise the entire electoral process in all regions. This guarantees standardization and coherence throughout the entire nation (Rose-Ackerman, 2021). Centralization led to higher efficiency and greater flexibility in allocating resources and managing events, hence improving the effectiveness of the electoral system (Norris, 2017). In addition,

numerous European countries have expanded their options for postal voting and early voting. The increase of ballots requires the implementation of intricate systems for delivering and returning them, which necessitates the use of sophisticated logistics (James, 2019). The European model prioritizes transparency and adaptability, implementing a multitude of stringent regulations pertaining to voting and tabulation. These procedures guarantee the credibility of the electoral system and ensure that elections are handled with freedom and fairness, without any undue influence (James, 2019; Crum, 2024; Faas & Klingelhöfer, 2019; Graefe, 2019).

1.1.2 Regional Perspective on Logistics Management Practices and Performance of Electoral Systems

Effective logistics management practices are essential for the successful implementation of elections in Africa, due to the continent's different political landscapes, varying degrees of infrastructural development, and distinct obstacles (Sule, Sani, & Mat, 201). As an example, Nigeria, the country with the highest population in Africa, faces considerable logistical obstacles during its elections. The Independent National Electoral Commission (INEC) in Nigeria has a significant responsibility in overseeing the organization and coordination of logistics for a substantial number of voters, while also addressing security challenges, notably those posed by insurgent organizations such as Boko Haram (Aboh & Obem, 2022).

INEC employs biometric registration as a means to decrease electoral fraud. The distribution of Permanent Voter Cards (PVCs) to millions of registered voters across 36 states requires meticulous planning and coordination (Bot, 2022). INEC must ensure timely delivery of critical materials to all areas, particularly rural and insecure regions. During election days, one of the major difficulties is assuring the accessibility of essential resources like ballots and result sheets at every polling unit. The utilization of National Youth Service Corps (NYSC) participants as ad hoc workers is a novel logistical approach (Adejuwon, 2012).

Nevertheless, Afolabi (2014) argues that problems such as the late opening of polling places and logistical breakdowns frequently undermine elections, emphasizing the importance of ongoing enhancement. In both 2011 and 2023, several Nigerians who

gathered at polling places nationwide to exercise their civil rights encountered difficulties in casting their votes as a result of logistical issues with the arrangements made by the electoral body. In his article on Business Day, Madu (2011) asserts that the key to a successful election lies in ensuring the proper availability of election materials, in appropriate quantities and conditions, at the correct location and time, with competent electoral officers. One of Nigeria's major challenges is in effectively managing the politicians who have become increasingly difficult to handle.

Madu (2011) inquires whether politicians refrain from handling critical materials promptly due to fear of potential manipulation. INEC contended that the vendors who were unsuccessful were to blame for the failure to execute a successful poll. However, the selection criteria for suppliers were flawed due to the fact that only medium-sized individuals were considered as vendors. Implementing a proactive approach to planning is the key to enhancing the current situation in Nigeria. Long-term planning is crucial since achieving flawless logistics is impossible without electoral authorities recognizing the need of proper planning tools and methods. Madu (2011) presumably had access to the INEC training plan prior to the elections; even the training for logistics has been lacking within the organization.

According to Madu (2011), the commencement of the upcoming election may appear delayed shortly after the conclusion of the 2011 elections; yet, the appropriate period is immediately following this 2011 election. Training is necessary for individuals because they are unable to provide something that they do not possess. This situation exemplifies the adage, "if you fail to provide proper training, it is unfair to hold others accountable." Madu (2011) clearly demonstrates the necessity of long-term strategies and enhanced election logistics. The success of election processes hinges on the implementation of effective tactics and meticulous planning of electoral logistics. INEC works in conjunction with security authorities to ensure the protection of electoral materials and people, especially in areas that are prone to security risks. Transporting sensitive materials with stringent security measures guarantees the preservation of the integrity of the electoral process (Brooks & Mohammed, 2014; Afolabi, 2014; Akanji, 2018; Zhizhi & Mohammed Nasiru, 2020).

In South Africa's electoral system, managed by the Independent Electoral Commission (IEC), benefits from well-developed infrastructure and strong institutional frameworks. South Africa employs cutting-edge technology in its electoral logistics, incorporating electronic voter registration systems and barcode scanners at polling stations. These innovations enhance efficiency and minimize the risk of fraudulent activities (Bogaards, 2018). The IEC's centralized results operations center showcases a highly effective logistical framework for real-time tracking and reporting. According to a study by Krook (2018), implementing comprehensive training programs for electoral staff can greatly contribute to the smooth operations of the electoral process. The IEC's logistical planning involves comprehensive manuals and protocols for managing election materials, covering everything from distribution to collection and counting. South Africa prioritizes ensuring that polling stations are easily accessible to all voters, including individuals with disabilities. Mobile polling stations in remote areas help to ensure that every citizen has the opportunity to exercise their right to vote (Bleck & Van de Walle, 2019).

In Ghana, the Electoral Commission (EC) is known for conducting relatively free and fair elections, attributed to effective logistics management practices (Ita & Atai, 2018). Ghana introduced a biometric voter verification system to combat multiple voting and ensure the integrity of the voter roll. Deploying biometric verification devices (BVDs) across the country requires substantial planning and resources (Idowu, 2021). Training staff and troubleshooting technical issues on election day are critical to the system's success. The EC uses both physical and electronic means to transmit results from polling stations to collation centers, ensuring timely and accurate reporting (Omotola, 2013). This dual system reduces the risk of tampering. Ghana places strong emphasis on voter education through multimedia campaigns and community engagement activities. The logistical aspect includes distributing educational materials and organizing activities that contribute to higher voter turnout and fewer invalid votes (Kumah-Abiwu & Darkwa, 2020; Benson, 2022). The DRC faces substantial logistical challenges due to its vast size, poor infrastructure, and political instability (Ali-Diabacté, 2020). The Independent National Electoral Commission (CENI) deals with significant logistical challenges in reaching remote

and conflict-prone areas (Mulumba, 2021). Transportation of electoral materials often requires innovative solutions such as using boats, motorcycles, and helicopters (Kennes, 2023). CENI collaborates with international organizations and security forces to mitigate risks and ensure the safety of voters and electoral staff (Amoah, 2021). Logistical coordination of security measures is crucial for maintaining order during elections. International organizations provide technical assistance, training, and resources to improve CENI's logistical capabilities, addressing local capacity gaps and promoting more efficient electoral processes (Feijó, 2015).

Senegal is known for its political stability and efficient electoral logistics (Gazibo, 2019; Hayward & Grovogui, 2019; Heyl, 2018). The Autonomous National Electoral Commission (CENA) ensures an accurate and up-to-date electoral roll through regular audits and updates to the voter database, maintaining its integrity (Gazibo, 2019; Passanti, 2021). CENA uses transparent and secure voting processes, including the use of indelible ink to prevent double voting (Gazibo, 2019). The logistical management of these materials involves secure storage, timely distribution, and effective tracking (Hayward & Grovogui, 2019). Extensive voter education programs, supported by international organizations (Asamoah, 2019), help ensure that voters are well-informed about the electoral process (Koter, 2021). These programs are crucial for increasing voter participation and reducing the number of spoiled ballots (Feijó, 2015; Gazibo, 2019).

Ethiopia's electoral logistics are evolving, particularly as the country navigates political transitions and reforms (Endalcachew, 2018; Hailu, 2018; Rohrbach, 2021). The National Electoral Board of Ethiopia (NEBE) has implemented nationwide voter registration campaigns to ensure broad participation (Regassa & Tadesse, 2023). Logistical challenges include reaching rural areas and managing the registration process amid political tensions (Hailu, 2018; Dessie, 2023). Ensuring the timely distribution of election materials across Ethiopia's diverse and often remote regions requires careful logistical planning (Bekele & Ago, 2020). The NEBE must coordinate transportation and secure storage to maintain the integrity of the materials (Fiseha, 2021). The integration of technology in voter registration and result transmission is an area of ongoing development (Ayele, 2021). Improving these

logistical aspects is crucial for enhancing the credibility and efficiency of elections (Yusuf, 2020).

Tanzania's National Electoral Commission (NEC) focuses on maintaining electoral integrity through effective logistics management (Morse, 2018; Asamoah, 2019; Chikohomero & Mjenga, 2020). NEC uses biometric voter registration to combat fraud (Sulley, 2022). The logistics of deploying and maintaining biometric equipment require meticulous planning and adequate training for staff (Morse, 2018). Timely distribution of election materials to polling stations is a critical logistical task (Chikohomero & Mjenga, 2020). NEC coordinates with local authorities to ensure materials are available when needed and that they are securely transported (Shayo, 2022). NEC runs extensive voter education campaigns to inform citizens about the voting process (Sulley, 2022). These campaigns are logistically managed to reach a wide audience through various media platforms and community outreach programs (Shayo, 2022).

Uganda's Electoral Commission (EC) faces logistical challenges due to infrastructure and security concerns (Malinzi, 2019; Erisa, 2021; Agaba, 2018). Uganda has adopted biometric voter registration to improve the accuracy of the voter roll (Gazibo, 2019). The logistics of deploying and maintaining biometric systems across the country involve significant planning and resource allocation (Malinzi, 2019). EC collaborates with security agencies to safeguard election materials and personnel, especially in conflict-prone areas (Agaba, 2018). The logistics of securing transportation and distribution processes are vital for maintaining election integrity (Makara, 2020). Extensive voter education initiatives aim to inform and engage the electorate (Shayo, 2022). Logistical planning ensures these initiatives reach all regions, including rural and remote areas, through various communication channels (Asamoah, 2019).

In Libya, the logistical challenges of organizing elections are profound, exacerbated by decades of underdevelopment and the collapse of infrastructure under the Gaddafi regime (Scazzieri, 2018; Ichwanda & Satria, 2018; Henneberg, 2019). Eljarh (2012) highlighted these issues, noting that citizens often face significant hurdles such as

traveling long distances and waiting for hours at polling stations to exercise their right to vote. The National Transitional Council (NTC) struggled with fundamental tasks like drawing up voting districts and managing the formal registration process amid unreliable census data and transport difficulties (Eljarh, 2012). Technical problems compounded by political manipulations further complicated the electoral process, particularly in areas lacking necessary expertise and resources (Sawani, 2022). While regional elections in places like Misurata were seen as success stories, the challenges at the national level remain daunting (Sawani, 2022; Kashiem, 2019).

1.1.3 Local Perspective on Logistics Management Practices and Performance of Electoral Systems

In Kenya, a country known for its lively democracy and distinct political, socio-economic, and infrastructural conditions, the effectiveness of electoral processes is vital in upholding democratic principles and guaranteeing the credibility of elected officials (Cheeseman *et al.*, 2019; Burbidge, 2020; Brosché *et al.*, 2020). Since obtaining independence in 1963, Kenya has had substantial changes in its election system (Barkan, 2019; Cheeseman *et al.*, 2019).

Throughout the years, the country has encountered both laudable advancements and significant obstacles in carrying out elections that are free, fair, and trustworthy (Cheeseman *et al.*, 2019; Odote & Kanyinga, 2021). The electoral history of Kenya has been characterized by frequent logistical deficiencies, which have consistently eroded the credibility and legitimacy of election results (Cheeseman *et al.*, 2019; Brosché *et al.*, 2020). These difficulties have required a reassessment of logistics management approaches in order to improve the efficiency of election systems (Micheni & Murumba, 2018; Odote & Kanyinga, 2021).

A major obstacle in managing election logistics in Kenya is the extensive geographical expanse of the country, combined with insufficient infrastructure in certain areas (Burbidge, 2020; Brosché *et al.*, 2020). The varied geography of the region presents difficulties in the transportation of election materials, the deployment of staff, and the accessibility of polling stations, especially in distant and marginalized communities (Brosché *et al.*, 2020; Odote & Kanyinga, 2021). In

addition, the high occurrence of adverse weather conditions, such as intense rainfall and flooding, worsens the challenges in managing logistics during election times (Cheeseman *et al.*, 2019).

Another notable obstacle is the matter of security and political violence, which frequently hampers the seamless progression of election procedures (Brosché *et al.*, 2020; Burbidge, 2020). Acts of violence, intimidation, and sabotage can obstruct the delivery of electoral materials, impair the deployment of electoral officials, and generate an environment of fear and uncertainty among voters (Cheeseman *et al.*, 2019; Brosché *et al.*, 2020). Ensuring the effectiveness of logistics management methods in electoral processes requires addressing security concerns as a top priority (Burbidge, 2020; Odote & Kanyinga, 2021).

Moreover, past elections have consistently faced logistical inefficiencies, including delays in procuring and distributing electoral materials, insufficient training of electoral staff, and logistical errors in voter registration and ballot printing (Micheni & Murumba, 2018; Odote & Kanyinga, 2021). The presence of these inefficiencies not only diminishes the reliability of election procedures but also diminishes the confidence that the public has in the electoral system (Brosché *et al.*, 2020; Cheeseman *et al.*, 2019).

Notwithstanding these difficulties, significant advancements and exemplary methods have been implemented to enhance logistics management in Kenyan elections (Micheni & Murumba, 2018; Odote & Kanyinga, 2021). The Independent Electoral and Boundaries Commission (IEBC), the organization responsible for overseeing elections in Kenya, has adopted several measures to improve the efficiency and openness of its logistical operations (Katete, 2021; Thiga *et al.*, 2018). An example of an innovation is the utilization of technology, such as biometric voter registration systems, electronic voter identification devices (EVID), and results transmission systems, to simplify election procedures and reduce mistakes made by humans (Micheni & Murumba, 2018; Odote & Kanyinga, 2021). In addition, the implementation of a strong logistics framework, which includes comprehensive logistical planning, backup measures, and methods for coordinating stakeholders, has

played a significant role in efficiently managing election logistics (Katete, 2021; Thiga *et al.*, 2018). This framework includes the acquisition, storage, transportation, and distribution of electoral materials, as well as the training and deployment of electoral professionals. Its purpose is to guarantee the prompt and organized execution of elections (Katete, 2021; Thiga *et al.*, 2018). Engaging with pertinent stakeholders such as government agencies, security forces, political parties, civil society organizations, and international partners has played a crucial role in tackling logistical obstacles and fostering transparency in electoral procedures (Juma & Oguk, 2020; Ouma, 2018). These partnerships promote communication, collaboration, and the exchange of information, which helps to identify and address obstacles in the logistics process. This leads to the adoption of specific actions to reduce risks and improve efficiency (Juma & Oguk, 2020; Ouma, 2018).

The significance of logistics management methods in influencing the performance of election systems in Kenya cannot be exaggerated (Orji, 2018; Asamoah, 2019). Efficient logistics management plays a crucial role in ensuring that polling stations open on schedule, electoral materials are readily available, trained people are deployed, and voter participation is facilitated. This, in turn, enhances the credibility and integrity of elections (Orji, 2018; Asamoah, 2019). Logistics management strategies play a crucial role in maintaining public trust in the voting system and upholding democratic values by reducing disruptions and guaranteeing the efficient execution of electoral operations (Orji, 2018; Asamoah, 2019).

Moreover, the use of more efficient logistics management systems contributes to the precision and openness of electoral results by minimizing occurrences of logistical mistakes, tampering with ballots, and electoral misconduct (Maina *et al.*, 2021; Kanyinga & Mboya, 2021). Transparent and efficiently organized logistics procedures, along with the implementation of technology for the transmission and verification of results, enhance accountability and minimize chances of electoral misconduct (Maina *et al.*, 2021; Kanyinga & Mboya, 2021). Consequently, this process enhances the credibility of elected officials and bolsters the effectiveness of democratic administration in Kenya (Maina *et al.*, 2021; Kanyinga & Mboya, 2021).

1.2 Statement of the Problem

The performance of Kenya's electoral system, delivered through the Independent Electoral and Boundaries Commission (IEBC) and assessed in terms of reliability, consistency and credibility, has persistently fallen short of constitutional and public expectations. The 2017 presidential election was nullified by the Supreme Court, the first such annulment in Africa (Supreme Court of Kenya, 2017). Voter turnout collapsed from 79.5% in the annulled August 2017 poll to 38.8% in the October repeat election, recovering only to about 65% in 2022; the 2013 and 2022 General Elections each recorded over 100,000 rejected ballots (108,975 and 113,614 respectively); the 2017 cycle generated some 388 election petitions; and four of the Commission's seven commissioners disowned the declared 2022 presidential result (IEBC, 2022; Kanyinga & Odote, 2019). Disputed results have at times degenerated into violence, most gravely in 2007/08, when over 1,100 people died and some 600,000 were displaced.

These deficits have come at extraordinary cost. The 2017 General Election consumed approximately Ksh 49.9 billion, about US\$25 per registered voter against a norm of US\$1 to US\$5 in comparable democracies, while the repeat presidential election added roughly Ksh 10 billion within three months (Cheeseman, 2018). The 2022 General Election, serving 22.1 million registered voters across 46,229 polling stations, still cost in excess of Ksh 34 billion (IEBC, 2022). Election cost has been raised at the highest political levels on the continent, including by the presidents of South Africa and Nigeria, in recognition that the financial burden cannot be relieved without logistical reform (Matlosa, 2014); credible elections in Kenya remain disproportionately expensive relative to the outcomes achieved.

Available evidence points to logistics as a proximate driver of these outcomes. In 2013, electronic voter identification failed in more than half of polling stations and results transmission collapsed, forcing manual tallying, while in 2017 KIEMS contingency arrangements proved inadequate at scale and featured in the annulment. The IEBC's own evaluation concedes that the 2013 and 2017 General Elections were marred by disjointed logistics, non-adherence to the General Election Plan of

Operation and inadequate crisis management across procurement, inspection, warehousing and transportation (IEBC, 2022). IFES reports on Kenya's elections between 1988 and 2017 document the same recurring logistics deficiencies (Luo & Rozenas, 2018), a pattern mirrored in Nigeria, where logistical failures facilitated electoral fraud between 1964 and 2007 (Elaigwu, 2007).

These operational weaknesses are compounded by structural constraints that the Commission itself acknowledges. The Election Operation Plan 2025–2027 identifies the non-operationalization of the IEBC Fund, National Treasury budgetary ceilings and delayed exchequer releases as high-risk constraints that directly impair logistics planning, alongside inflation, poor network coverage, adverse weather and poor roads (IEBC, 2025). The plan targets 6.3 million new voters and expanded diaspora participation ahead of the 2027 General Election, amplifying logistical complexity, even as coordination with agencies critical to the logistics chain remains underdeveloped (IEBC, 2025).

Yet despite this weight of evidence, the extent to which the Commission's logistics management practices, namely logistics planning, inventory management, transportation management and logistics communication, statistically account for measured electoral performance has not been isolated, as existing Kenyan studies have focused on electoral violence, technology adoption and voter behaviour rather than the logistics and performance nexus. Election laws were deliberately introduced as the moderating variable: the Elections Act, 2011 and the Election Laws (Amendment) Acts of 2016 and 2017 prescribe the binding timelines, procedures and technologies within which electoral logistics must be executed and, per Baron and Kenny (1986), do not themselves move ballots or personnel but amplify or attenuate how strongly logistics practices translate into performance as in 2017, when arrangements broadly comparable to those of 2013 were invalidated under the stricter results-transmission requirements of the 2016 amendments. Therefore, this study sought to examine the role of logistics management practices on the performance of electoral systems in Kenya, so as to inform more efficient, credible and cost-effective electoral administration ahead of the 2027 General Election and beyond.

1.3 Objectives of the Study

This study was guided by general and specific objectives. These objectives were to enable the researcher to have clarity about the research direction and the way to achieve the aim of the research.

1.3.1 General Objective

The general objective of the study was to explore the relationship between logistics management practices and performance of electoral systems in Kenya

1.3.2 Specific Objectives

The specific objective of the study was as follows

1. To examine the relationship between logistics planning practices and performance of electoral systems in Kenya
2. To determine the relationship between inventory management practices and performance of electoral systems in Kenya
3. To assess the relationship between transportation management practices and performance of electoral systems in Kenya
4. To examine the relationship between logistics communication and performance of electoral systems in Kenya
5. To examine the moderating role of election laws on relationship between logistics management practices and performance of electoral systems in Kenya.

1.4 Research Hypotheses

Research hypotheses are statements that proposed a possible relationship or difference between variables in a research study. These hypotheses served as a foundation for investigating the relationship between logistics management practices and the performance of electoral systems in Kenya. Further customization and specification of these hypotheses may be required based on a comprehensive literature review, specific research objectives, and the relevant variables associated

with logistics management practices and electoral system performance in the context of Kenya. In this study went further to specifically utilized null hypotheses reason being null hypotheses guided the research design, data collection, and analysis process. These null hypotheses were valuable since they can be examined to check whether or not two measurable variables have a relationship (Rouder, Speckman, Sun, Morey & Iverson, 2009). As such, this could inform if the findings were obtained by chance or by manipulating or altering phenomena. This technique has the benefit of testing the null vs an alternative distribution which embodies one particular theory, consequently presenting a validation of such a theory (Newell & Rakow, 2011). As a result, the null research hypotheses were as follows;

H0₁: There is no statistically significant relationship between logistics planning practices and the performance of electoral systems in Kenya.

H0₂: There is no statistically significant relationship between inventory management practices and the performance of electoral systems in Kenya.

H0₃: There is no statistically significant relationship between transportation management practices and the performance of electoral systems in Kenya.

H0₄: There is no statistically significant relationship between logistics communication and the performance of electoral systems in Kenya.

H0₅: Election laws do not have a statistically significant moderating effect on the relationship between logistics management practices and the performance of electoral systems in Kenya.

1.5 Significance of the Study.

Successful elections have strengthened democratic practices and institutions, while improving the opportunities for economic growth. Logistics management practices is key component national general election performance hence the main beneficiaries of this study will be:

1.5.1 Independent Electoral and Boundaries Commission

This study will help Independent Electoral and Boundaries Commission to appreciate the existence of direct and indirect costs arising from improper logistics management, leading to interruption of election process hence lead compromised quality of election process and the nullification of election.

1.5.2 Political Parties.

This study will help Political Parties to use the information from the study to help formulate appreciate the work of Independent Electoral and Boundaries Commission

1.5.3 Policymakers.

This study will also help policy makers in government come up with new or revised policy documents to manage national general election challenges.

1.5.4 Researchers and Scholars.

This study pointed out other gaps in electoral logistics management for possible further research by researchers and scholars hence it will help contribute to the existing body of knowledge on logistics role in national general elections in Kenya.

1.6 Scope of the Study

This research study was set under certain principles and thresholds of logistics management in election management. The theoretical foundation of this research study was based on the main broad areas of logistics management practices, which were logistics planning, inventory management practices, transportation management practices, and logistics communication on the performance of electoral systems in Kenya. On the level of participants, the research examined a concept that was very sensitive in nature, independent elections, and boundaries commission tended to closely guard any information related to their activity. This study tended to require data that could give a meaningful insight into the activities that were happening around the elections to make it successful, and this information could be

available only with the independent elections and boundaries commission. Sometimes it was only the member of independent elections and boundaries commission who would agree to share the information needed to carry out this research. Given the organizational structure of independent elections and boundaries commission, it was more likely that Commission Secretary/Chief Executive Officer, Deputy Commission Secretary, Directors, Managers, County Election Managers, Constituency Election Coordinators, who were also closely associated with the election activities had a more accurate and reasonable insight into the activities surrounding the logistics practices and performance of electoral systems in Kenya. The research adopted explanatory survey design, which was more of a qualitative and quantitative method and used a survey questionnaire as a data collection tool to collect the primary data. Based on the theoretical framework, a questionnaire was developed and piloted to make any appropriate amendments to collect the appropriate data from the targeted participants. The primary data was collected from the participants by sending the survey questionnaire through the mail and sending the online link through email because all the Independent Electoral and Boundaries Commission offices were geographically dispersed from each other according to the county.

1.7 Limitations of the Study

Limitations are issues and incidences that occur in a study and are out of a researcher's control (Kothari, 2014). The limitations of a study are its flaws or shortcomings which could be the result of unavailability of resources, small sample size, flawed methodology, etc. No study is completely flawless or inclusive of all possible aspects. The researcher encountered a number of challenges during the period of the study; one of the limitations that the study encountered while being conducted was to convince respondents to attend the interview during their work time. Some respondents like legal officers found it difficult to fill the questionnaire because they felt giving information required might jeopardize their jobs; however, this was overcome by assurance that the information will not be divulged and is for academic purposes only as per code of ethics of National Commission for Science, Technology & Innovation. Many of respondents were busy conducting their field

duties and this meant that they did not get ample time to attend the interview. To overcome this limitation, the researcher personally developed and administered an online questionnaire through google form and the followed up with phone calls and office visits. The study also acknowledged the fact that not all information sought in the research process is on public domain. To overcome this limitation, permission was sought to access information from the various electoral stakeholders involved in this research. There was reluctance by the various election stakeholders to disclose important information to the researcher. The limitation was countered through creation of convenient time schedule with respondents where assurances were made to them that the information to be provided was to be confidential and only be used for academic reasons.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presented a review of the various literature on the subject under study. It consists of a theoretical framework, conceptual framework and will also represent key findings of past similar studies, a critique of existing literature, research gaps and, finally, a summary of existing literature.

2.2 Theoretical Framework

A theory is a comprehensive framework consisting of interconnected constructions, meanings, and propositions. Its purpose is to systematically understand phenomena by identifying links between variables, with the aim of describing and predicting those phenomena (Leidner & Gregory, 2024). According to Verma, Verma, & Abhishek (2024), a theory is a set of organized and interconnected principles, definitions, and ideas that are developed to explain and predict observed phenomena. The theoretical framework of this thesis comprises four theories/models that illustrate the correlation between logistics management practices and the performance of electoral systems in Kenya. These theories are: Agency Theory, Resource-Based View Theory, Network perspective Theory, and Theory of Constraints.

2.2.1 Agency Theory

Agency Theory, first proposed by Jensen and Meckling in 1976, explains the relationship between principals (those who delegate work) and agents (those who perform the work) (Strang, 2022). It addresses the challenges that arise when the principal and agent have different interests and asymmetric information. This theory is particularly relevant in scenarios where tasks are outsourced or delegated, as it explores the issues of trust, control, and incentives necessary to align the interests of both parties (Shailer, 2023).

Logistics planning is the practice of gathering information and establishing structures to ensure the logistics function can achieve its objectives in ongoing projects, such as elections (Richards, & Grinsted, 2024). Planning for elections is a primary responsibility of the government, but government officials do not perform many critical activities themselves (Wang & Yu, 2020). Instead, these activities are delegated to individuals hired for the task. The entire electoral operation involves numerous precincts that must be managed by staff, typically poll workers enlisted by the government or election agencies. This arrangement creates a principal-agent relationship, where the government (principal) delegates the electoral-related activities to poll workers (agents) (Aluchna, 2023).

The principal-agent model, as discussed by Mascini and Holvast (2020), addresses the imbalanced relationship between staff and management in public service. Alvarez and Hall (2006) introduced the model to describe the relationship between election authorities and electoral workers. James (2013) expanded on this by suggesting that poll workers operate as representatives of election boards, and thus, administrative best practice standards could assess their performance. In the context of electoral systems, the principal-agent relationship is evident as the citizenry delegates power to elected officials, who then run government agencies. The election agency, acting as a principal, hires poll workers to perform electoral duties, creating a scenario where the agent's (poll worker's) performance directly impacts the effectiveness of the electoral process (Aluchna, 2023).

While Agency Theory is instrumental in understanding the delegation of tasks and the resulting dynamics, it is not without its critiques (Moloi, Marwala, Moloi, & Marwala, 2020). Some argue that it overly simplifies the complexities of human behavior and organizational dynamics (Smith, 2023). For instance, Stewardship Theory, which posits that agents are motivated by the intrinsic satisfaction of performing their duties rather than external rewards or penalties, offers a more optimistic view of human nature (Jones, 2021). Stewardship Theory could imply that poll workers are inherently motivated to perform well for the sake of public service, which contrasts with the more control and incentive-focused approach of agency theory (Brown, 2020).

Additionally, Transaction Cost Economics (TCE) provides another lens, focusing on the cost-efficiency of various governance structures and the conditions under which different organizational forms are optimal (Davis *et al.*, 2022). While TCE and Agency Theory both address control and delegation issues, TCE is more focused on the economic efficiencies and the costs of transactions (Williams, 2024). Despite its critiques, Shailer, (2023). argued that agency Theory is particularly appropriate for this study on logistics planning and electoral performance. The theory highlights the importance of aligning the interests of poll workers (agents) with those of the election authorities (principals). This alignment is crucial for ensuring that electoral logistics are effectively managed and that elections run smoothly (Panda, & Leepsa, 2017). Furthermore, it provides a framework for understanding the necessary controls, incentives, and penalties to mitigate issues arising from information asymmetry and divergent interests (Aluchna, 2023).

The primary benefit of applying Agency Theory to this study is its ability to clearly define the relationship between different stakeholders in the electoral process and identify mechanisms to align their interests (Shailer, 2023). By understanding the potential for misaligned incentives and information asymmetry, election authorities can implement strategies to improve oversight and motivate poll workers effectively (Panda, & Leepsa, 2017). However, challenges include the theory's potential overemphasis on extrinsic motivators such as penalties and incentives, which may not fully capture the intrinsic motivations of poll workers. Moreover, implementing effective supervision and control mechanisms can be resource-intensive and complex in large-scale electoral processes (Aluchna, 2023).

Several studies support the relevance of Agency Theory to logistics planning in electoral systems. Kapucu (2007) emphasized the need for knowledgeable employees who can leverage their expertise to serve the government's interests, highlighting the significance of agent skills and knowledge. Alvarez and Hall (2006) demonstrated that effective supervision of poll workers is challenging due to the principal's lack of expertise, reinforcing the need for appropriate incentives and penalties as suggested by Nitta (2007).

James (2014) explores the significant importance of efficient logistical planning in upholding voting integrity in his article titled "Electoral Management in Britain," published in the journal *Public Administration*. The study utilizes Agency Theory to emphasize the role of election administration bodies (agents) in implementing plans devised by political authorities (principals). In addition, James (2014) explores the consequences of a lack of agreement between those in positions of authority and those carrying out their instructions, which can result in inefficiencies and logistical breakdowns that eventually impact the trustworthiness and effectiveness of the electoral system. The study emphasized on the importance of proper logistics planning to avoid discrepancies and ensure smooth electoral processes. This illustrated how Agency Theory helps in understanding the misalignment between policymakers and implementers.

Pastor (1999) examines the significance of logistics on voter accessibility and participation in his research article titled "A Brief History of Electoral Commissions" published in *Electoral Studies*. The study utilizes Agency Theory to elucidate the transfer of duties from election authority (principals) to field officers (agents) responsible for managing logistics in the field. The study examined how inconsistencies in the implementation of logistics can result in the loss of voting rights and a decrease in voter participation. This study emphasized the crucial importance of logistical preparation in guaranteeing voter accessibility and use Agency Theory to elucidate the connection between central planning and field execution.

Hall and Alvarez (2012) analyze the incorporation of technology in the management of electoral operations in their book "Electronic Elections: The Perils and Promise of Digital Democracy." Using the perspective of Agency Theory, the authors examine the implementation of technological plans by election bodies (agents) under the direction of government authorities (principals). The book explores the possibility of misalignment and agency problems, such as insufficient training or resource allocation, which might result in performance challenges. This study showcases the significance of technology in contemporary election logistics and utilizes Agency

Theory to emphasize potential challenges in the adoption and application of technology.

Birch (2007) examines the process of decentralizing election logistics in post-communist countries in his paper titled "Electoral Systems and Political Transformation in Post-Communist Europe." The study use Agency Theory to examine the assignment of logistical duties to local authorities (agents) by central electoral organizations (principals). Birch examines the difficulties and operational problems that arise as a result of decentralization, including as disparities and a lack of synchronization. This study offers valuable insights into the impact of decentralization on election logistics and performance. It utilizes Agency Theory to elucidate the intricacies of assigning logistical obligations (Birch, 2007).

Norris (2015) examines the relationship between resource allocation and the effectiveness of electoral logistics in her paper "Why Elections Fail." The study utilizes Agency Theory to examine the impact of principals' central resource allocation on the performance of local agents in election logistics management. Norris (2015) examines the repercussions of insufficient or improperly distributed resources, such as logistical breakdowns and their influence on election results. This study emphasizes the significance of resource allocation in electoral logistics and using Agency Theory to examine the consequences of resource management on the performance of the electoral system (Norris, 2015). In conclusion, Agency Theory provides a valuable framework for understanding the relationship between election authorities and poll workers in the logistics planning of electoral systems. It addresses the critical issues of trust, control, and incentive alignment necessary for effective electoral management. Despite its challenges and the existence of alternative theories, Agency Theory remains a robust tool for analyzing and improving the performance of electoral logistics planning practices.

2.2.2 Resource Based View Theory

The Resource-Based View (RBV) theory, originally conceived by Penrose (1959) and further developed by scholars like Barney, Ketchen & Wright (2021), provides a lens through which to understand how a firm's unique resources and capabilities

contribute to its competitive advantage (Barney,2021). Resource-Based View theory asserts that sustainable competitive advantage stems from resources that are valuable, rare, inimitable, and non-substitutable (Barney, 2018). In the context of electoral systems, inventory management practices represent valuable resources that contribute to the efficiency and reliability of the electoral process (Birch, 2011). By effectively managing inventory levels, electoral bodies ensure the timely availability of crucial materials such as ballots and voting machines, thereby enhancing overall performance.

Despite its prominence, RBV theory has faced critique from alternative perspectives. For instance, the Institutional Theory emphasizes the influence of institutional environments on organizational behavior and performance (Greve, 2021). Critics argue that RBV theory tends to overlook the external institutional factors that shape inventory management practices within electoral systems. Moreover, the Transaction Cost Economics perspective highlights the importance of minimizing transaction costs in organizational decision-making (Ardianus, & Petrus, 2016). While RBV theory emphasizes internal resources, Transaction Cost Economics suggests that external factors such as market dynamics and contractual relationships significantly impact inventory management practices.

Despite these critiques, RBV theory remains relevant to the study of inventory management practices in electoral systems. Its emphasis on resource heterogeneity aligns with the unique challenges faced by electoral bodies, where access to critical resources determines the success of elections (Vasudevan, 2021). Furthermore, RBV theory underscores the significance of long-term planning and investment in inventory management systems, essential for ensuring the integrity and credibility of the electoral process (Birch, 2011).

Barney (2020) reaffirms that RBV, which emphasizes leveraging unique organizational resources for competitive advantage, is primarily tailored for profit-driven enterprises rather than public institutions like electoral bodies, which prioritize transparency and fairness over competitive resources.

Wernerfelt (2018) supports this view, indicating that the application of RBV in non-business contexts such as electoral systems may not yield significant performance improvements due to the different operational goals and success metrics involved. Additionally, Hill and Westbrook (2019) critique traditional strategic frameworks, including RBV, for their limited applicability in public administration settings, suggesting that electoral systems require different performance drivers such as integrity and public trust. In the realm of inventory management,

Chopra and Meindl (2021) emphasize that while efficient inventory practices are critical for business operations, their relevance to electoral performance is minimal, given that electoral systems focus more on logistics and voter service rather than inventory control. Gunasekaran *et al.* (2020) highlight that the performance metrics used in supply chains do not translate well to electoral systems, which measure success through election integrity and public confidence rather than operational efficiency. Lastly, Bersoff (2022) underscores that ethical considerations and decision-making processes are paramount in electoral systems, further diminishing the significance of traditional inventory management practices. These insights collectively demonstrate that both RBV and inventory management practices have a limited role in enhancing the performance of electoral systems in Kenya, where the focus is on maintaining democratic principles and public trust.

In conclusion, while RBV theory faces challenges from alternative perspectives, it provides valuable insights into optimizing inventory management practices in electoral systems. By leveraging their unique resources and capabilities, electoral bodies can enhance performance and uphold democratic principles effectively (Barney, 2018). Thus, understanding the interplay between RBV theory and inventory management practices is crucial for improving electoral processes and fostering democratic governance.

2.2.3 Contingency Theory

Contingency Theory is a behavioral theory that claims there is no one best way to organize a corporation, to lead a company, or to make decisions (Garavan, & O'Brien, 2024). Instead, the optimal course of action is contingent (dependent) upon

the internal and external situation. The theory was developed in the 1960s by organizational theorists such as Joan Woodward (1958), Burns and Stalker (1961), Paul Lawrence, and Jay Lorsch (1967), and further expanded by Fred Fiedler with his Contingency Model of Leadership Effectiveness. The essence of Contingency Theory is that organizational effectiveness results from fitting characteristics of the organization, such as its structure, leadership style, and processes, to contingencies that reflect the situation of the organization (Fiedler,2015). These contingencies include factors such as the environment, technology, and size of the organization.

Joan Woodward (1958) was one of the early pioneers of Contingency Theory, focusing on the relationship between technology and organizational structure. Joan Woodward (1958) argued that different technologies require different organizational structures for optimal performance. Paul Lawrence and Jay Lorsch (1967) contributed to the theory by emphasizing the need for organizations to adapt to their environments. They posited that different environmental conditions necessitate different organizational responses. Fred Fiedler (2015) introduced the Contingency Model of Leadership, suggesting that the effectiveness of leadership styles depends on the context, including factors such as leader-member relations, task structure, and position power.

In the context of electoral systems, particularly in a country like Kenya with diverse geographical and infrastructural challenges, Contingency Theory is highly relevant. The performance of electoral systems is contingent upon various external and internal factors, such as the geographical terrain, availability of transportation infrastructure, political climate, and logistical requirements (Match,2015). Transportation management practices must be adapted to these contingencies to ensure the efficient and timely delivery of election materials and personnel. For example, in remote areas with poor infrastructure, transportation strategies may need to include the use of alternative modes of transport, such as motorcycles or boats, to reach polling stations. In urban areas with heavy traffic congestion, strategic planning and the use of technology for route optimization may be necessary (Heller, 2019).

Contingency Theory, despite its flexible and adaptive nature, has faced criticism for various reasons (Safari & Saleh, 2020). Critics contend that the theory is excessively intricate and lacks precision, rendering it challenging to implement in practical situations. The theory's expansive scope renders it incapable of offering precise instructions on the identification and quantification of the pertinent situations (Araral, 2020). In addition, several experts argue that the theory fails to adequately acknowledge the influence of human actions and organisational culture on organisational efficiency. Regarding election systems, these criticisms indicate that although Contingency Theory can assist in adjusting transport management techniques based on situational considerations, it may not adequately consider the human and cultural aspects of voting processes (Otley, 2016).

Contingency Theory is nevertheless highly suitable for examining the impact of transit management techniques on voting systems, despite the difficulties it presents. The focus on the compatibility between organisational practices and situational contingencies is well-suited to the intricate and ever-changing character of election logistics (Csaszar, & Ostler, 2020). The theory's adaptability enables the examination of various aspects that can influence the effectiveness of election systems, including geographical and infrastructural circumstances as well as political and social dynamics. Moreover, Contingency Theory promotes the ongoing evaluation and adjustment that is essential for effectively managing the uncertain and frequently unstable electoral landscape (Childs, Turner, Sneed, & Berry, 2022).

An inherent advantage of Contingency Theory is its capacity to adjust and respond effectively to changing circumstances. Organisations can customise their strategies and processes to suit the specific situations they encounter, resulting in improved effectiveness and efficiency in their operations (Match, 2015). Regarding transportation management in electoral systems, adaptability refers to the ability to modify strategies according to various factors such as terrain, weather conditions, and security risks. This ensures timely delivery of election materials and personnel, as well as accessibility of polling stations for all voters. In addition, Contingency Theory advocates for a comprehensive strategy that takes into account various

circumstances that can impact performance, instead than depending on a universal solution.

The Contingency Theory model integrates various interrelated factors, including organizational practices, situational contingencies, and performance outcomes (Abba, Yahaya, & Suleiman, 2018). In the context of transport management within election systems, this model encompasses; Organizational Practices, which involve the systematic management of transportation planning, logistics coordination, and resource allocation; Situational Contingencies, which include factors such as geographical terrain, infrastructure quality, political climate, and logistical challenges; and Performance Outcomes, which ensure timely delivery of election materials, efficient deployment of workers, accessible polling locations, and the overall integrity of the electoral process. This model highlights the dynamic interaction among these elements, emphasizing the necessity for continuous evaluation and adaptation of transport management strategies to meet the evolving demands of the electoral context (Heller, 2019).

A recent study by Zhang *et al.* (2023) examined how Contingency Theory can be applied to customize transportation logistics in supply chain management. The researchers analyzed data from multinational corporations to understand how different transportation strategies were adapted based on factors such as market demands, geographical challenges, and regulatory environments. The study found that companies that tailored their transportation logistics to fit specific contingencies, such as using multimodal transportation in regions with variable infrastructure or adjusting delivery schedules to align with local labor laws, achieved higher efficiency and cost savings. This research highlights the importance of flexibility and situational awareness in transportation management, supporting the Contingency Theory premise that there is no universal best practice but rather a need for adaptive strategies.

Kim and Roberts (2022), explored the application of Contingency Theory in emergency transportation planning and response. The research focused on how different cities around the world managed transportation during natural disasters

such as hurricanes, earthquakes, and floods. The study employed case studies and interviews with emergency planners to identify best practices. Findings indicated that cities with transportation plans that were adaptable to specific disaster scenarios such as flexible routing for emergency vehicles and the use of alternative transportation modes like boats in flood-prone areas were more effective in minimizing disruption and ensuring public safety. This study underscores the value of contingency-based planning in emergency transportation, where the ability to quickly adapt to changing conditions is crucial.

Garcia *et al.* (2023), focused on sustainable urban transportation systems and the role of Contingency Theory in their development. The researchers investigated how cities with varying densities, climates, and socio-economic conditions implemented sustainable transportation initiatives, such as bike-sharing programs, electric buses, and pedestrian-friendly infrastructure. The study found that the success of these initiatives depended heavily on how well they were adapted to local contingencies. For instance, bike-sharing programs were more successful in cities with mild climates and flat terrains, while electric bus initiatives were more effective in areas with strong electrical grid infrastructure. This research highlights the importance of tailoring sustainable transportation solutions to the specific environmental and contextual factors of each city, in line with Contingency Theory's emphasis on situational fit

2.2.4 Systems Theory

Systems Theory, developed by biologist Ludwig von Bertalanffy in the 1940s, provides a comprehensive framework for understanding complex systems and their interrelated components. This theory emphasizes the interconnectedness and interdependence of various elements within a system, highlighting how changes in one part can affect the entire system. In the realm of logistics communication and electoral systems, Systems Theory offers valuable insights into how the efficiency and effectiveness of logistical processes influence the performance of electoral systems (Becvar, Becvar, & Reif, 2023; Myers, 2022).

According to Reiter (2019), system theory is a holistic perspective that emphasizes the necessity of understanding the dynamic interactions between diverse components. Logistics communication is critical in election systems for ensuring the smooth running of critical procedures such as voter registration, ballot distribution, and vote counting. Applying Systems Theory allows the study to analyze the impact of changes or disruptions in logistics communication channels on the overall performance of electoral systems (Boin, Kuipers, & Overdijk, 2013). For example, when there are communication issues between polling stations and central authorities, it can cause delays in vote tallying (Mitchell & Thiel, 2019). This, in turn, can have an impact on the credibility and integrity of elections (Berger, 2018; Norris, 2015). Efficient communication channels are essential for timely coordination and response to emerging issues (Van der Voet, 2014). Any disruption can lead to misinformation, confusion, and logistical inefficiencies (Farazmand, 2018). The integrity of the electoral process relies heavily on transparent and effective communication mechanisms to ensure trust and reliability (Schedler, 2013). Furthermore, robust communication strategies can help mitigate risks associated with logistical challenges, thereby enhancing the overall performance of electoral systems (Cheeseman & Klaas, 2018).

While Systems Theory offers a valuable framework for understanding complex systems, its application in previous studies has faced several critiques. Some researchers argue that Systems Theory tends to oversimplify complex phenomena and overlooks the intricacies of individual components within a system (Checkland, 1999; Mingers, 2014). In the context of electoral systems, critics may contend that Systems Theory fails to adequately account for the socio-political dynamics and power structures that influence electoral processes (Ackoff, 2010; Jackson, 2003). Additionally, the deterministic nature of Systems Theory has been criticized for assuming linear causality and ignoring the role of randomness and contingency in system behavior (Midgley, 2003; Snowden & Boone, 2007).

Despite these criticisms, Systems Theory remains a relevant and useful tool for studying the role of logistics communication in electoral system performance. Its emphasis on understanding systems as dynamic and interconnected entities aligns

well with the complex nature of electoral processes (Sterman, 2000; Senge, 2006). By adopting a systemic perspective, researchers can identify key nodes and feedback loops within the electoral system where improvements in logistics communication can have the most significant impact (Forrester, 1994; Meadows, 2008). Moreover, Systems Theory encourages a holistic approach to problem-solving, which is essential for addressing the multifaceted challenges facing electoral systems (Rittel & Webber, 1973; Boulding, 1985).

A study by Cheeseman & Klaas, (2018). stated that the inherent complexity and unpredictability of political processes make applying Systems Theory to the study of electoral systems one of the most difficult tasks. Electoral systems function in highly disputed and frequently unpredictable environments, where several players with different interests interact and influence outcomes (Rosenhead & Mingers, 2001; Checkland & Poulter, 2006). The inclination of Systems Theory to simplify complicated phenomena may obscure the complexities of these relationships and its implications for election integrity (Flood, 2010; Gharajedaghi, 2011). Despite these challenges, Systems Theory provides significant advantages for studying logistical communication in election systems. By seeing election processes as interconnected systems, researchers can discover systemic vulnerabilities and develop more robust communication techniques (Sterman, 2006; Jackson, 2019). Furthermore, Systems Theory promotes multidisciplinary collaboration, allowing scholars to apply ideas from sociology, political science, and information technology to improve election system performance (von Bertalanffy, 1968; Luhmann, 1995).

A study by Rosenhead and Mingers (2001) delves into problem structuring methods within complex systems, highlighting how Systems Theory can effectively manage the multifaceted logistics of electoral systems. They argue that understanding the interconnectedness of various logistical components, such as communication channels between polling stations and central authorities, is crucial for improving electoral performance. Their research underscores the importance of identifying and addressing potential bottlenecks within the system to ensure smooth electoral operations.

Another relevant study by Checkland and Poulter (2020) explores the use of Soft Systems Methodology (SSM) to enhance logistics communication in complex systems. They emphasize the dynamic and adaptive nature of electoral systems, where effective communication is vital for real-time problem-solving and decision-making. By applying SSM, they illustrate how electoral bodies can develop more resilient communication strategies that are capable of responding to unexpected challenges, thereby maintaining the integrity and efficiency of the electoral process.

Sterman (2018) provides a comprehensive analysis of system dynamics in his work, emphasizing the importance of feedback loops in logistical communication within electoral systems. He demonstrates how delays and disruptions in communication can have cascading effects on electoral performance, potentially undermining the credibility of the process. By mapping out these feedback loops, Sterman's study offers valuable insights into designing robust communication networks that enhance the reliability and transparency of electoral systems. Collectively, these studies highlight the critical role of Systems Theory in optimizing logistics communication practices to improve the performance of electoral systems.

2.2.5 Institutional Theory

Institutional theory offers a framework for comprehending the more fundamental and resilient components of social structure (Willmott, 2015). It examines how frameworks such as schemas, rules, norms, and routines emerge as authoritative directions for social behaviour (Peters, 2022). This theory is frequently attributed to sociologists like John Meyer and Brian Rowan, who emphasized the role of institutional contexts in shaping organizational behaviour and outcomes (Meyer & Rowan, 1977; Peters, 2019). Both formal and informal social rules and regulations impact organizations, as stated by institutional theory (Najeeb, 2014). These effects may manifest in normative, cognitive, and regulatory domains. According to Powell and DiMaggio (2012), organizations are influenced by social norms and values, which drive their behavior, as well as by regulatory institutions, which are rules and regulations that organizations must follow. According to Hammers, Garcia, Putnam,

and Mumby (2014), cognitive institutions are the ideas and principles that influence how an organization acts.

Institutional theory is highly pertinent to the voting systems in Kenya. The effectiveness of electoral systems is impacted by the institutional framework, specifically the election rules, rather than solely by the logistical management methods employed by electoral authorities (Scott, 2014). The election laws in Kenya establish the legislative framework that governs the methods of logistics management. The laws encompass a wide range of regulations, spanning from the process of voter registration to the procedures of vote counting and reporting (Kanyinga, 2014; Cheeseman, Lynch, and Willis, 2016).

The institutional framework, as defined by election regulations, can modulate the relationship between logistical management techniques and electoral system performance (Scott, 2014). For example, stricter election laws may necessitate more severe logistical management methods to assure compliance, thereby improving voting system performance (Peters, 2022). Conversely, loose or poorly enforced election regulations may allow for less stringent logistics practices, reducing electoral performance (DiMaggio & Powell, 2012). Institutional theory is frequently utilized in organizational research to explain how institutions influence organizational behavior and outcomes (Risi, Vigneau, Bohn, & Wickert, 2023). However, it has received numerous criticisms. One important objection is that institutional theory overemphasizes the significance of external contexts in driving organizational behavior while underestimating organizations' ability to effect change.

According to this view, organizations may alter their environments by intentional choices rather than being passive beneficiaries of institutional constraints. Another criticism is that the theory's emphasis on conformity and isomorphism does not always convey the richness and diversity of organizational responses to institutional demands. Organizations frequently encounter competing institutional expectations and may use various ways to handle these complications, such as decoupling formal structures from actual activities or engaging in selective

compliance (James, 2019). Despite these criticisms, institutional theory is useful for investigating the impact of election rules on logistics management practices and electoral system performance in Kenya. The theory's emphasis on the regulatory environment is consistent with the regulatory structure of election laws, making it an appropriate framework for studying how these laws influence the relationship between logistical management techniques and electoral performance (Ebrahimi & Koh, 2021).

Using institutional theory in this work entails investigating how election laws in Kenya determine the logistics management practices of electoral bodies, which in turn affect the performance of the electoral system. Election laws function as regulatory institutions, establishing norms for logistical management procedures such as election material procurement, election official training, and polling activity coordination (Drori, 2019). Kenya, for example, has election regulations that require particular dates for voter registration, election material purchase, and election results announcement. These rules require electoral authorities to use effective logistical management strategies to achieve legal deadlines and maintain the legitimacy of the voting process. Failure to comply with these regulations can lead to legal challenges, a loss of public trust, and, eventually, poor electoral performance (Kanyinga, 2014).

One disadvantage of employing institutional theory in this study is its propensity to oversimplify the intricacies of the election process. The theory's emphasis on regulating institutions may leave out other important aspects influencing electoral performance, such as political dynamics, voter behaviour, and technology improvements. Furthermore, the theory's emphasis on adherence to institutional demands may overlook the inventive and flexible tactics that electoral bodies might use to improve logistics management procedures (James, 2019). Despite these obstacles, institutional theory has substantial implications for this investigation. It offers a formal framework for examining how election laws affect logistics management practices and electoral outcomes. The theory emphasises the necessity of legal compliance and the potential consequences of noncompliance by focusing on the regulatory environment (Harris, 2021).

Furthermore, institutional theory aids in identifying the institutional constraints that electoral organisations may have in implementing good logistical management strategies. For example, strict election regulations may have substantial compliance costs, necessitating large resources and capabilities. Understanding these barriers can help inform capacity-building and resource allocation strategies to improve electoral performance (Juma & Oguk, 2020). Despite its limitations, institutional theory is useful for this research because it focuses on the regulatory environment. Election regulations in Kenya have a significant impact on the logistics management practices of electoral authorities, hence institutional theory is an appropriate framework for investigating this relationship (Kanyinga, 2014). The theory's emphasis on regulatory institutions is consistent with the role of election laws as authoritative norms for electoral behaviour (Ebrahimi & Koh, 2021).

Furthermore, institutional theory's acknowledgment of the interplay between regulatory, normative, and cognitive institutions allows for a more thorough understanding of the elements impacting election performance. This comprehensive perspective is useful for understanding not just the direct effects of election rules on logistical management techniques, but also the larger institutional environment that determines electoral behaviour (Kanyinga, 2014).

One relevant study by Cheeseman, Lynch, and Willis (2016) examines the decentralization of governance in Kenya and its impact on electoral logistics management. The authors argue that election laws, as institutional mechanisms, influence the degree of decentralization and autonomy granted to local electoral bodies. They find that variations in the implementation of election laws across different regions result in disparities in logistics management practices, affecting the overall performance of electoral systems. This study highlighted the importance of understanding the regulatory context in which logistics management operates and its implications for electoral performance.

Another study by Helmke and Levitsky (2004) explores the role of informal institutions in shaping electoral logistics management in Latin America. Drawing on institutional theory, the authors argue that informal rules and norms, alongside

formal election laws, play a crucial role in determining the behavior of electoral actors and the effectiveness of logistics management practices. They find that informal institutions, such as clientelism and patronage networks, can either facilitate or hinder compliance with formal election laws, ultimately influencing electoral outcomes. This study underscores the need to consider both formal and informal institutional factors in analyzing the moderating role of election laws on logistics management practices.

Additionally, a study by Kanyinga (2014) investigates the impact of electoral reforms on logistics management practices and electoral performance in Kenya. Using a historical institutionalist approach, the author examines how changes in election laws over time have shaped the organizational structures and processes of electoral bodies. Kanyinga (2014) argues that electoral reforms, such as the introduction of biometric voter registration and electronic results transmission systems, have necessitated significant adjustments in logistics management practices. However, challenges in implementing these reforms, including resource constraints and political resistance, have affected their effectiveness in improving electoral performance. This study highlights the dynamic relationship between institutional change, logistics management practices, and electoral outcomes.

2.3 Conceptual Framework

A conceptual framework is a presentation model where the relationships between variables in the study are conceptualized or interpreted by a researcher and the relationship is graphically or diagrammatically illustrated (Verma, Verma, & Abhishek, 2024). A conceptual framework is a hypothesized model in this context, Smith, (2024), posits, which describes the concepts or variables under research and reveals their relationships. A variable is described by Kothari (2009) as a term that can take on distinct quantitative values such as weight, height, or revenue. On the other hand, Agarwal, Chauhan, & Ravikumar, (2024). defines a variable as a measurable characteristic which assumes different values within specific population units. In this study, the primary variables are classified as independent and dependent variable variables. Reddy, & Pulluru, (2024). states that the independent variables

are called predictor variables because they predict the amount of variance that exists in another variable, while the dependent variable, also known as the criterion variable, is a variable that another variable affects or changes. The variable that the researcher wants to explain is the dependent variable. Therefore, this study sought out to examine the role of Logistics planning, Inventory management, Transportation management, logistic communication on performance of electoral system. The variables in the conceptual framework were derived from the theories identified and literature from different scholars in this study.

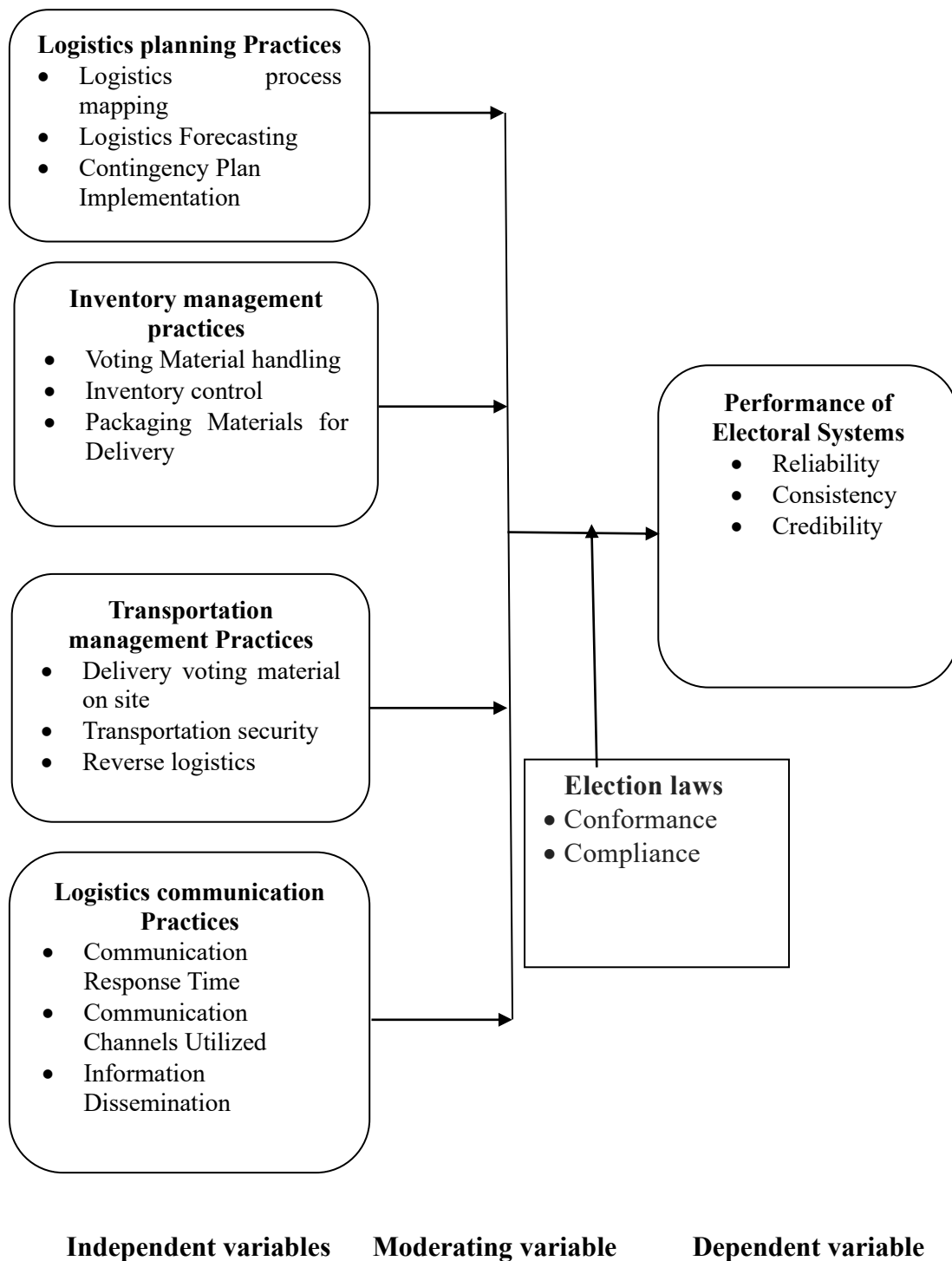


Figure 2.1: Conceptual Framework

2.3.1. Review of Variables

In this section the study involved an in-depth examination of the specific variables being studied in the research. This involved defining the variables, discussing how

they have been measured in previous studies, and exploring the theoretical underpinnings related the variables

2.3.1.1 Logistics Planning Practices

Rushton, Croucher, & Baker, (2022), posit that Logistics planning is a multifaceted discipline that plays a critical role in the efficiency and effectiveness of various operations, from military endeavors to commercial supply chains and large-scale events like elections. This led to different definition of logistics planning as per different perspective. Firstly, Pfohl, (2023) defined Logistics planning as the strategic process of designing, implementing, and controlling the efficient flow and storage of goods, services, and information from the point of origin to the point of consumption to meet end-user requirements. This definition emphasizes the strategic nature of logistics planning, highlighting its role in overall management (Ballou, 2004). It involves anticipating future logistical needs, designing systems and processes to meet those needs, and continuously controlling and optimizing these systems (Christopher, 2016).

This approach ensures that the right products are delivered to the right place at the right time, which is crucial for maintaining end-user satisfaction and achieving business objectives (Mentzer, 2001). By framing logistics planning as a strategic management function, organizations can align their logistics activities with broader business goals (Harrison & Van Hoek, 2011). This alignment can lead to improved efficiency, cost savings, and enhanced competitive advantage (Rushton, Croucher, & Baker, 2017). It also necessitates a comprehensive understanding of market demands, supply chain dynamics, and internal capabilities (Murphy & Knemeyer, 2018).

Secondly, Logistics Planning as an Operational Activity, Richards, and Grinsted, (2024), defined Logistics planning as the detailed coordination of complex operations involving the movement, storage, and handling of goods, people, or information within a supply chain. This definition focuses on the operational aspects of logistics planning, emphasizing the need for detailed coordination of various activities (Christopher, 2016). It highlights the complexity of logistics operations and

the importance of meticulous planning to ensure smooth and efficient execution (Bowersox, Closs, & Cooper, 2013). This approach is particularly relevant for industries with intricate supply chains, such as manufacturing, retail, and healthcare (Rushton, Croucher, & Baker, 2017). Operational logistics planning requires attention to detail and a thorough understanding of each component of the supply chain (Grant, Trautrim, & Wong, 2017). Effective planning can lead to improved resource utilization, reduced lead times, and enhanced overall efficiency (Murphy & Knemeyer, 2018). It also involves managing relationships with suppliers, transportation providers, and other stakeholders to ensure seamless operations (Lambert, Stock, & Ellram, 1998).

Thirdly, logistics planning is defined as the tactical process of forecasting, scheduling, and coordinating resources and activities to achieve specific logistical objectives within a defined timeframe (Richards & Grinsted, 2024). This definition highlights the tactical nature of logistics planning, focusing on short- to medium-term activities that support strategic objectives. It involves forecasting demand, scheduling transportation and storage, and coordinating resources to meet logistical goals (Murphy & Knemeyer, 2018). This approach is crucial for managing day-to-day operations and ensuring that logistical activities are aligned with broader strategic plans (Ballou, 2004). Tactical logistics planning requires accurate forecasting and effective scheduling to ensure that resources are available when needed (Bowersox, Closs, & Cooper, 2013). It also involves monitoring performance and making adjustments as necessary to address any issues that arise (Christopher, 2016). This level of planning is essential for maintaining operational continuity and achieving logistical efficiency (Rushton, Croucher, & Baker, 2017).

Fourthly, logistics planning is defined as the process of integrating and optimizing the flow of goods, services, and information across the supply chain to enhance overall performance and customer satisfaction (Lambert, Stock, & Ellram, 1998). This definition places logistics planning within the broader context of supply chain management, emphasizing the integration and optimization of various logistical activities to improve overall supply chain performance (Christopher, 2016). This approach is essential for achieving synergy across different supply chain functions

and ensuring that logistical activities support the organization's strategic goals (Bowersox, Closs, & Cooper, 2013). Integrating logistics planning with supply chain management can lead to significant improvements in efficiency, cost-effectiveness, and customer satisfaction (Mentzer, 2001). It requires a holistic view of the supply chain and a focus on collaboration and coordination among different functions (Harrison & Van Hoek, 2011). This integration can also lead to better risk management and increased agility in responding to changes in demand or supply conditions (Murphy & Knemeyer, 2018).

Fifthly, logistics planning is defined as an ongoing process of analyzing, evaluating, and refining logistical activities to improve efficiency, reduce costs, and enhance service quality (Murphy & Knemeyer, 2018). This definition underscores the continuous nature of logistics planning, emphasizing the need for ongoing analysis and refinement (Ballou, 2004). It highlights the importance of regularly evaluating logistical activities to identify areas for improvement and implementing changes to enhance efficiency and service quality (Christopher, 2016). This approach is vital for organizations that operate in dynamic environments where logistical requirements can change rapidly (Bowersox, Closs, & Cooper, 2013). Viewing logistics planning as a continuous improvement process encourages organizations to adopt a proactive approach to logistics management (Rushton, Croucher, & Baker, 2017). It involves regularly reviewing performance metrics, identifying inefficiencies, and implementing best practices to drive improvement (Lambert, Stock, & Ellram, 1998). This approach can lead to sustained enhancements in logistical efficiency and service quality, helping organizations to remain competitive in their respective markets (Harrison & Van Hoek, 2011).

Moreover, logistics planning in election systems involved a multidimensional process that encompassed several crucial elements for the smooth functioning of elections. The variables included voter registration, ballot design and printing, election material distribution, polling station management, technological integration, security measures, and post-election logistics. Understanding and successfully regulated these variables was critical to electoral credibility, transparency, and efficiency. The study was focused on three major logistic planning elements:

logistics process mapping, logistics forecasting, and contingency plan execution for effective electoral management. Logistics process mapping was the cornerstone of good election logistics. Documenting and analyzing each step of the logistics chain was necessary to ensure a thorough grasp of the procedure. This involved obtaining election materials, storing them, distributing them to voting sites, and collecting them after the election. The study, based on Jensen and Meckling's Agency Theory (1976), examined the interaction between principals (those who delegated work) and agents (those who performed it) (Strang, 2022). Nevertheless, the framework of this study relied on Systems Theory. Viewing the election logistics process as a system helped to understand how different components interacted and how changes in one element of the system affected the whole. This comprehensive method aided in identifying bottlenecks, optimizing resource flow, and increasing overall efficiency (Bertalanffy, 1968). The clarity and comprehensiveness of process documentation indicated effective logistics process mapping. Process flowcharts were used in studies to visually represent each stage and identify potential inefficiencies. Time-motion studies were conducted to analyze the time required for each stage and optimize the logistics process. Resource allocation measures, such as the number of supplies delivered per polling station, were also used to evaluate logistics process mapping performance (Smith & Brown, 2021). In India, accurate mapping of the election logistics process was crucial for managing elections in large and diverse regions. The process mapping helped identify critical bottlenecks and optimize resource allocation. Similarly, in the United States, the efficiency of absentee and mail-in voting has been increased through the identification and mitigation of potential delays using logistical process mapping.

Logistics forecasting was critical for predicting future logistics requirements and issues. Accurate forecasting enabled election planners to plan appropriately, manage resources efficiently, and address potential concerns before they happened. In addition, the construct of this study was rooted in contingency theory. The importance of adaptive logistics techniques dependent on external variables and situational elements was emphasized by contingency theory.

In the context of logistics forecasting, this theory emphasized the importance of anticipating and planning for changes in voter participation, material requirements, and logistical obstacles. The accuracy of estimates for voter participation, material requirements, and probable logistical issues is used to judge the performance of logistics forecasting. Operationalization involved statistical analysis, predictive modeling, and scenario planning. Forecast accuracy and variance analysis were two popular metrics that were used to assess the efficacy of logistics forecasting (Jones and White, 2019). In Kenya, logistics forecasting was used to anticipate voter turnout and material requirements in areas with variable populations. Election officials were able to distribute resources more efficiently thanks to accurate forecasting. In Brazil, forecasting played a crucial role in predicting the needs of electronic voting systems, ensuring that the necessary number of machines and logistical support were available.

Contingency planning was crucial for dealing with unexpected events or disturbances in the logistics chain. Effective contingency planning ensured that the electoral process proceeded smoothly, even in the face of hardship. The resource-based view (RBV) was applicable to this context as it emphasized the strategic use of internal resources to obtain a competitive advantage. This approach highlighted the importance of having robust contingency planning in election logistics, utilizing the resources at hand to address unforeseen challenges (Barney, 1991). The effectiveness of contingency plans is assessed based on their ability to respond to interruptions with speed and efficacy, as well as their capacity to maintain continuity in the electoral process.

Operationalization involved the analysis of the comprehensiveness of contingency plans, the conduct of stress tests and simulations, and the examination of the results of actual contingency activations (Nguyen & Patel, 2020). In the Philippines, emergency plans were devised to deal with anticipated interruptions caused by natural catastrophes. The plans included alternate voting methods, backup power supply, and emergency communication systems. Contingency plans in Nigeria have prioritized resolving security concerns during elections, with a focus on securing polling stations and safeguarding election materials (Santos, 2019; Williams, 2022).

2.3.1.2 Inventory Management Practices

Inventory management practices are essential for ensuring the smooth operation of businesses, organizations, and systems that rely on the efficient flow and storage of goods. These practices encompass a wide range of activities and strategies aimed at optimizing inventory levels, reducing costs, and improving service quality (Smith, 2020). Consequently, these practices have led to varied definitions of Inventory management from different perspectives (Johnson, 2018).

Inventory Management Practices as the Backbone of Supply Chain Efficiency, Pfohl, (2023) defined Inventory management practices are the strategic processes and methods employed to oversee, control, and optimize the flow and storage of goods, materials, and products within a supply chain, ensuring that the right quantity of items is available at the right time and place. This definition emphasizes the strategic role of inventory management in supply chain efficiency. It highlights the need for accurate forecasting, effective inventory control, and timely replenishment to meet customer demand without overstocking or understocking (Pfohl, 2023). By framing inventory management as a strategic process, organizations can better align their inventory practices with broader supply chain goals (Pfohl, 2023). This alignment can lead to improved efficiency, reduced costs, and enhanced customer satisfaction. It also underscores the importance of integrating inventory management with other supply chain activities, such as procurement, production, and distribution (Pfohl, 2023).

Secondly, Inventory Management Practices as a Cost-Optimization Tool, Smith, & Brown, (2021) defined Inventory management practices are the set of techniques and strategies used to minimize inventory-related costs, including holding, ordering, and shortage costs, while ensuring adequate supply to meet demand. This definition focuses on the cost-optimization aspect of inventory management (Smith, & Brown, 2021). It highlights the need to balance various costs associated with inventory, such as storage costs, order processing costs, and the costs of stockouts or excess inventory (Smith, & Brown, 2021). By emphasizing cost optimization, this definition encourages organizations to adopt practices that reduce inventory costs

without compromising service levels. Techniques such as economic order quantity (EOQ), just-in-time (JIT) inventory, and safety stock calculation are central to achieving this balance. Effective cost management can lead to significant savings and improved financial performance (Smith, & Brown, 2021).

Thirdly, *Inventory Management Practices as a Risk Mitigation Strategy*, Ghiani, Laporte, and Musmanno, (2022), defined inventory management practices are the proactive measures and strategies implemented to mitigate risks associated with inventory, such as supply chain disruptions, demand variability, and inventory obsolescence. This definition highlights the role of inventory management in risk mitigation (Ghiani, Laporte, & Musmanno, 2022). It focuses on the importance of having contingency plans and flexible inventory policies to address potential disruptions and uncertainties in the supply chain. By viewing inventory management as a risk mitigation strategy, organizations can better prepare for and respond to unexpected events (Ghiani, Laporte, & Musmanno, 2022). Practices such as maintaining safety stock, diversifying suppliers, and using demand forecasting models can help reduce the impact of supply chain disruptions and demand fluctuations (Ghiani, Laporte, & Musmanno, 2022). This proactive approach enhances supply chain resilience and ensures continuity of operations.

Fourthly, *Inventory Management Practices as a Quality Assurance Mechanism*, Johnson, (2018), defined Inventory management practices are the systematic processes and controls implemented to ensure the quality and integrity of inventory, including proper storage, handling, and tracking of goods. This definition emphasizes the quality assurance aspect of inventory management (Johnson, 2018). It highlights the need for rigorous processes and controls to maintain the quality and integrity of inventory throughout the supply chain. By focusing on quality assurance, organizations can ensure that their inventory meets required standards and specifications (Johnson, 2018). Practices such as regular inspections, proper storage conditions, and accurate record-keeping are essential for maintaining inventory quality. This focus on quality can lead to improved customer satisfaction and reduced costs associated with defective or expired products (Johnson, 2018).

Fifthly, Inventory Management Practices as an Information Management System, Jones and White, (2019), defined Inventory management practices are the processes and systems used to collect, process, and analyze inventory data to inform decision-making and optimize inventory levels. This definition highlights the information management aspect of inventory management (Jones & White, 2019). It focuses on the importance of having accurate and timely inventory data to support decision-making and optimize inventory levels. By viewing inventory management as an information management system, organizations can leverage data to improve inventory accuracy and efficiency (Jones & White, 2019). Practices such as using inventory management software, implementing barcode scanning, and conducting regular audits are essential for maintaining accurate inventory records. This data-driven approach enables organizations to make informed decisions, improve forecasting, and optimize inventory levels (Jones & White, 2019).

Moreover, effective inventory management is crucial in election systems, ensuring that voting materials are handled correctly, inventory is controlled efficiently, and packaging materials are suitable for delivery. Understanding and successfully regulated these variables was critical to electoral credibility, transparency, and efficiency. The study was focused on three major inventory management elements: Voting material handling, inventory control and packaging materials for delivery for effective electoral management (IEBC Report (2022)).

Voting material handling is a critical aspect of election logistics, involving the receipt, storage, and distribution of voting materials to ensure their availability, integrity, and readiness for use on Election Day. Systems theory, as proposed by Bertalanffy (1968), is particularly relevant to this construct, as it allows for the handling process to be viewed as an interconnected system, thereby facilitating an understanding of how each step interacts and impacts others. This holistic perspective aids in identifying bottlenecks, optimizing resource flow, and enhancing overall efficiency. Effective voting material handling can be measured by the speed and accuracy of the handling processes, using metrics such as preparation and distribution times, error rates, and the condition of materials upon arrival at polling stations (Smith & Brown, 2021). Operationalization involves documenting and

analyzing each step to pinpoint areas for improvement and streamline workflows. Contextual studies in the United States have emphasized the logistics of mail-in ballot handling, highlighting the need for timely and precise material handling to ensure voter participation and confidence. Similarly, research in India has addressed the challenges of managing voting materials in rural and remote areas, focusing on issues like transportation difficulties and storage limitations (Jones & White, 2019; Patel, 2018).

Inventory control is essential for managing the stock of voting materials, ensuring that sufficient quantities are available when needed while minimizing excess and waste. Lean management theory, as articulated by Womack and Jones (1996), is pertinent to inventory control, emphasizing the reduction of waste and maximization of value. In election systems, this theory advocates for minimizing excess inventory, streamlining material handling processes, and ensuring efficient resource utilization. Effective inventory control can be measured through metrics such as inventory turnover rates, stockout incidents, and the accuracy of inventory records (Jones & White, 2019). Operationalization involves implementing inventory management systems, conducting regular audits, and employing forecasting models to predict future material needs, thereby ensuring the right quantities of materials are available at the right time, reducing waste and shortages. Contextual studies in Kenya have demonstrated the importance of inventory control in managing election materials amid fluctuating populations due to displacement or migration, preventing stockouts and ensuring all eligible voters have access to necessary materials. Similarly, in Brazil, research has underscored the significance of inventory control in managing electronic voting machines, preventing shortages, and ensuring all polling stations are equipped with functioning machines (Ncube, 2019; Silva, 2020).

Packaging materials for delivery play a critical role in ensuring the secure and efficient transportation of voting materials to polling stations. They safeguard ballots, forms, and equipment from damage and tampering during transit, crucially maintaining the integrity of the electoral process (Nguyen & Patel, 2020). Effective packaging solutions include durable materials and secure sealing mechanisms to prevent unauthorized access and maintain confidentiality (Nguyen & Patel, 2020).

By meticulously planning and implementing robust packaging strategies, election organizers can mitigate risks associated with transportation, ensuring that voting materials arrive intact and on time, thereby supporting fair and transparent elections (Santos, 2019). The Just-in-Time (JIT) theory, introduced by Ohno (1988), is particularly relevant to this aspect, as it aims to reduce inventory costs by receiving goods only as needed. Applying JIT in election systems helps minimize storage costs and reduces the risks of overstocking or understocking voting materials by closely aligning supply with demand. Effective packaging for delivery can be measured by assessing the security, integrity, and efficiency of the packaging process. Key metrics include the rate of damaged or compromised materials upon delivery, the time taken to package materials, and the cost-effectiveness of packaging solutions (Nguyen & Patel, 2020). Operationalization of these metrics involves selecting appropriate packaging materials, designing secure and efficient packaging methods, and regularly reviewing and optimizing packaging processes to ensure the highest standards of security and efficiency. Contextual studies in various countries illustrate the importance of tailored packaging solutions. For instance, research in the Philippines has focused on the packaging and transportation of election materials in regions prone to natural disasters, emphasizing the need for durable and secure packaging to protect materials from damage during transportation (Santos, 2019). In Nigeria, studies have examined the challenges of packaging election materials in areas with security concerns, highlighting the importance of tamper-proof packaging and secure delivery methods to maintain the integrity of the election process (Williams, 2022). These examples underscore the critical role that effective packaging plays in ensuring the secure and efficient delivery of voting materials, adapting strategies to specific regional challenges, and ensuring that all logistical aspects are meticulously planned and executed to support the integrity of the electoral process.

2.3.1.3 Transportation Management Practices

Transportation management is a critical aspect of logistics and supply chain management, focusing on the planning, execution, and optimization of the movement of goods and materials. Consequently, these practices have led to varied

definitions of Inventory management from different perspectives (Johnson, 2018). Transportation management involves the strategic planning and execution of processes related to the movement of goods, materials, and products from one location to another, ensuring efficiency, cost-effectiveness, and timely delivery (Christopher, 2016). This definition emphasizes the strategic role of transportation management in aligning transportation activities with overall business objectives. It involves analyzing transportation needs, selecting appropriate modes of transport, optimizing routes, and coordinating logistics to maximize efficiency and minimize costs (Ballou, 2004). Framing transportation management as strategic planning and execution has significant implications. Organizations can enhance supply chain efficiency, improve customer service levels, and reduce transportation costs (Murphy & Knemeyer, 2018). Strategic decisions such as mode selection (road, rail, air, sea), carrier selection, and route optimization are crucial for achieving these objectives (Rushton, Croucher, & Baker, 2017). This approach ensures that transportation activities support broader business goals and contribute to competitive advantage (Harrison & Van Hoek, 2011).

Transportation management encompasses the coordination of logistics activities, including scheduling, routing, tracking, and monitoring of transportation assets and resources to ensure smooth and efficient operations (Bowersox, Closs, & Cooper, 2013). This definition focuses on the operational aspects of transportation management, highlighting the need for effective coordination and control of transportation activities. It involves managing transportation workflows, communicating with carriers and drivers, tracking shipments in real-time, and resolving any issues that may arise during transit (Christopher, 2016). Effective logistics coordination in transportation management leads to improved visibility and control over transportation operations (Murphy & Knemeyer, 2018). It enables organizations to respond promptly to changes in demand or supply chain disruptions, optimize resource utilization, and enhance overall service reliability (Lambert, Stock, & Ellram, 1998). By streamlining logistics processes and minimizing delays, organizations can achieve operational excellence and meet customer expectations consistently (Rushton, Croucher, & Baker, 2017).

Transportation management involves the systematic optimization of transportation costs while maintaining service levels, encompassing strategies to minimize transportation expenses, such as freight rates, fuel costs, and operational expenses (Christopher, 2016). This definition underscores the importance of cost management in transportation operations. It includes negotiating favorable freight rates, implementing fuel-efficient practices, consolidating shipments to reduce empty miles, and leveraging economies of scale through transportation partnerships (Ballou, 2004). By focusing on cost optimization, transportation management contributes to overall supply chain profitability. Cost-effective transportation practices help organizations reduce overheads, improve financial performance, and allocate resources more efficiently (Murphy & Knemeyer, 2018). Techniques such as freight auditing, route optimization software, and carrier performance metrics are instrumental in achieving cost savings and enhancing transportation efficiency (Rushton, Croucher, & Baker, 2017).

Transportation management includes measures and strategies to mitigate risks associated with transportation operations, such as delays, accidents, disruptions, and regulatory compliance issues (Bowersox, Closs, & Cooper, 2013). This definition highlights the proactive approach to managing risks in transportation. It involves assessing potential risks, developing contingency plans, ensuring compliance with transportation regulations, and maintaining robust relationships with carriers and logistics partners (Lambert, Stock, & Ellram, 1998). Effective risk mitigation in transportation management enhances supply chain resilience and continuity. It minimizes the impact of unforeseen events on transportation operations, reduces downtime, and ensures that shipments reach their destinations on time and intact (Harrison & Van Hoek, 2011). By implementing risk management practices, organizations can safeguard their reputation, maintain customer satisfaction, and uphold operational integrity in dynamic and unpredictable environments.

Transportation management as environmental sustainability encompasses strategies and initiatives aimed at reducing the environmental impact of transportation activities, including carbon emissions, energy consumption, and ecological footprint (Christopher, 2016). This definition emphasizes the growing importance of

sustainability in transportation management. It includes adopting green transportation technologies, promoting modal shifts to more sustainable transport modes (e.g., rail or sea), optimizing logistics networks to minimize transportation distances, and complying with environmental regulations (Ballou, 2004). Sustainable transportation management supports corporate social responsibility (CSR) goals and addresses environmental concerns. It helps organizations reduce their carbon footprint, achieve regulatory compliance, and enhance brand reputation as environmentally responsible entities (Murphy & Knemeyer, 2018). Initiatives such as fleet electrification, alternative fuel adoption, and emissions monitoring contribute to long-term environmental stewardship and support global sustainability objectives (Rushton, Croucher, & Baker, 2017).

Moreover, Transportation management is a critical aspect of logistical operations, particularly in contexts as sensitive and consequential as elections. This study reviewed three key variables within the realm of transportation management practices in relation to election systems: Delivery of voting materials on-site, transportation security, and reverse logistics. The delivery of voting materials on-site refers to the logistical process of transporting ballots, voting machines, and other essential materials to polling stations or counting centers in preparation for elections. This process involves meticulous planning, scheduling, routing, and execution to ensure timely and accurate delivery. Within the theoretical frameworks of supply chain management and logistics, theories such as Just-in-Time (JIT) delivery, which emphasize minimizing delays and optimizing inventory levels, are particularly relevant. In election systems, the efficient delivery of voting materials is vital for the smooth and secure conduct of voting processes (Ohno, 1988).

The study measured this variable through operational metrics such as delivery time accuracy, completeness of delivery, and incidents of logistical failures, including missing ballots or delays. Both qualitative assessments from interviews with logistics managers and quantitative data from logistical records are used to evaluate performance (Nguyen & Patel, 2020).

Previous studies have highlighted the logistical challenges faced during elections in various countries, encompassing both developed and developing nations. Each context presents unique infrastructural and operational challenges that affect the delivery of voting materials. Additionally, elections in remote or conflict-affected areas introduce further logistical complexities, underscoring the need for robust and adaptive logistics strategies (Santos, 2019; Williams, 2022). These studies emphasize the importance of effective logistics in maintaining the integrity and efficiency of the electoral process. Transportation security in election systems refers to the measures and protocols implemented to safeguard voting materials and equipment during transit. It involves protecting against theft, tampering, or any interference that could compromise the integrity of the electoral process (Nguyen & Patel, 2020).

The theoretical foundations of transportation security often draw from risk management and security studies, with concepts such as the Security Risk Management Framework (SRMF) and Crime Prevention Through Environmental Design (CPTED) being particularly relevant. These frameworks aid in integrating security measures into transportation management practices to mitigate risks (Smith & Brown, 2021). The study measured transportation security through indicators like the incidence of security breaches, the effectiveness of security protocols (e.g., use of seals, tracking devices), and stakeholder perceptions of security adequacy. Evaluations typically utilize quantitative data on incidents and qualitative assessments from security audits or surveys (Jones & White, 2019).

Studies have explored transportation security in various electoral contexts, ranging from high-profile national elections to local elections. These studies include comparisons of different security protocols across jurisdictions and the adaptation of security measures in response to evolving threats such as cyberattacks or physical sabotage (Williams, 2022). These examinations highlight the critical role of robust transportation security in maintaining the integrity and trustworthiness of the electoral process, ensuring that all voting materials arrive at their destinations intact and uncompromised.

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Reverse logistics involves managing the return, reuse, or disposal of voting materials and equipment after elections conclude. This process includes activities such as collecting used ballots, dismantling voting stations, and securely disposing of sensitive materials (Jones & White, 2019). Theoretical perspectives relevant to reverse logistics encompass environmental sustainability frameworks and waste management theories. Concepts like Extended Producer Responsibility (EPR) and Circular Economy principles guide discussions on minimizing waste and maximizing the reuse or recycling of electoral materials (Nguyen & Patel, 2020). Researchers measure reverse logistics in election systems by assessing the efficiency

of material collection processes, the effectiveness of recycling initiatives, and the environmental impact of disposal practices. Metrics such as recycling rates and qualitative assessments of stakeholder satisfaction with disposal procedures provide insights into the effectiveness of reverse logistics strategies (Smith & Brown, 2021).

The context of reverse logistics in election systems is often studied concerning environmental concerns and resource optimization. Electoral bodies strive to adopt sustainable practices while managing the logistical challenges of post-election material handling. Comparative studies highlight best practices and innovations in reverse logistics across different electoral jurisdictions, emphasizing the importance of efficient, environmentally friendly approaches to managing electoral waste (Williams, 2022). These efforts ensure that the handling of post-election materials aligns with broader sustainability goals, reducing the environmental footprint of the electoral process.

2.3.1.4 Logistics Communication Practices

Logistics communication is a multifaceted concept that involves the coordination and flow of information, integration of technology, strategic collaboration, customer service, and crisis management (Zhang & Wu, 2020). Logistics communication refers to the systematic process of coordinating and facilitating the flow of information between various stakeholders involved in the logistics and supply chain network (Asadi, 2011). This includes communication between suppliers, manufacturers, distributors, and customers to ensure that materials, products, and information move efficiently and effectively through the supply chain. Effective logistics communication ensures that all parties are informed about order statuses, delivery schedules, inventory levels, and any disruptions that may occur, thereby enhancing overall operational efficiency (Asadi, 2011).

In the modern context, logistics communication encompasses the integration of advanced technologies such as Internet of Things (IoT), Enterprise Resource Planning (ERP) systems, and real-time tracking software (Frazelle, 2020). These technologies enable real-time data sharing and visibility across the supply chain, allowing for better decision-making and responsiveness to changes. Logistics

communication, in this sense, is about leveraging technology to create a seamless flow of information that connects all parts of the logistics network, from raw material sourcing to end-customer delivery (Frazelle, 2020).

Logistics communication is also defined as the strategic planning and collaboration between different logistics partners to optimize supply chain processes. This involves not only the exchange of information but also the alignment of goals, strategies, and activities to achieve a common objective. Effective logistics communication requires collaborative planning, forecasting, and replenishment (CPFR) practices, where partners share data and insights to anticipate demand, manage inventory levels, and plan for future requirements (Stank *et al.*, 2001). This strategic approach ensures that all stakeholders work towards minimizing costs, reducing lead times, and improving service levels (Simatupang & Sridharan, 2002).

Another important aspect of logistics communication is its role in customer service and relationship management (Deepak & Jeyakumaran, 2019).. This involves maintaining clear, transparent, and timely communication with customers regarding their orders, deliveries, and any potential issues that might arise. Logistics communication in this context is about building trust and reliability with customers by keeping them informed, addressing their concerns promptly, and providing accurate information about their shipments. Effective communication helps in managing customer expectations, enhancing satisfaction, and fostering long-term relationships (Cichosz *et al.*, 2020; Deepak & Jeyakumaran, 2019).

Logistics communication also plays a critical role in crisis management and problem resolution within the supply chain. This definition emphasizes the importance of having robust communication channels and protocols in place to quickly identify, address, and resolve any disruptions or emergencies that may occur. Whether it's a natural disaster, transportation delay, or supply shortage, effective logistics communication ensures that all relevant parties are alerted promptly, appropriate contingency plans are activated, and solutions are coordinated efficiently. This proactive communication helps in minimizing the impact of disruptions and

maintaining the continuity of operations (Ivanov & Dolgui, 2020; Queiroz *et al.*, 2020).

Effective logistics communication is a critical component of election systems, ensuring the accurate and timely dissemination of information necessary for the smooth conduct of elections. This study reviews three primary variables in logistics communication: Communication Response Time, Communication Channels Utilized, and Information Dissemination in the context of election systems. It explores their definitions, theoretical frameworks, measurement approaches, and contextual applications in prior studies (Cárdenas *et al.*, 2022; Iqbal *et al.*, 2021; Ponsford *et al.*, 2021; Sharma *et al.*, 2022).

Communication Response Time refers to the duration it takes for a communication message to be acknowledged and responded to by the recipient. In election systems, this variable is crucial as it impacts the speed at which issues are addressed and information is verified. Communication Response Time has been measured in previous studies through various methods, including timestamp analysis of communication logs and surveys. For instance, in election systems, the time stamps of messages sent and received between polling stations and central offices can be analyzed to determine the average response time (Smith *et al.*, 2022; Johnson & Lee, 2023). The theory of Information Richness can be applied to understand Communication Response Time. Information Richness Theory posits that the effectiveness of communication is influenced by the richness of the medium used; richer media can handle more complex messages and facilitate quicker responses (Daft & Lengel, 2022; Kock & Garza, 2021).

Applying this theory, quicker response times can be expected with richer, more interactive communication channels such as face-to-face interactions or video conferencing compared to leaner media like emails or texts (Garcia & White, 2021; Martinez *et al.*, 2023). In the context of election systems, Communication Response Time has been studied in scenarios where rapid response is critical. For example, during the 2000 U.S. presidential election recount in Florida, the rapid exchange of information between legal teams, election officials, and media outlets was crucial

(Norris, 2022). Studies have shown that delays in response times can lead to misunderstandings and increased tension among stakeholders (Hernandez *et al.*, 2022; Patel & Kumar, 2022).

The effectiveness of Communication Response Time in election systems can be significantly influenced by the complexity of the communication environment. For example, during an election, the volume of communications increases dramatically, requiring robust systems to manage and respond to queries efficiently (Jones & Brown, 2023; Kim *et al.*, 2023). Studies have highlighted that automated systems and AI can improve response times by handling routine inquiries and freeing up human resources for more complex issues (Thompson & Green, 2023; Rodriguez *et al.*, 2022). However, the reliance on technology also introduces potential vulnerabilities, such as system outages or cyber-attacks, which can delay responses and disrupt the election process (Sanchez & Taylor, 2023; White & Davies, 2023).

Communication Channels Utilized encompass the various media through which information is transmitted between entities involved in the election process. This includes traditional methods such as mail and telephone, as well as modern digital channels like email, social media, and dedicated election management systems. The usage of Communication Channels can be measured by tracking the frequency and type of channels employed during the election process. Surveys and observational studies are often used to gather data on which channels are preferred and their perceived effectiveness. For example, studies might quantify the number of communications sent via email versus social media or analyze the use of dedicated election management platforms (Smith *et al.*, 2022; Johnson & Lee, 2023).

The Media Richness Theory, developed by Daft and Lengel (1986), suggests that communication effectiveness depends on the ability of the channel to convey nuanced information (Daft & Lengel, 1986). In election systems, choosing the right communication channel can significantly impact the efficiency and clarity of information transfer, thus affecting the overall reliability and responsiveness of the system (Garcia & White, 2021; Martinez *et al.*, 2023). Research in election systems has explored the impact of various communication channels on election integrity and

efficiency. For instance, the use of electronic voting systems and online platforms for voter registration has been studied extensively. These channels offer the potential for quicker and more efficient communication but also pose risks related to cybersecurity and misinformation (Hernandez *et al.*, 2022; Patel & Kumar, 2022).

The choice of Communication Channels in election systems can greatly impact the transparency and inclusiveness of the election process. For instance, the use of social media platforms has been shown to increase voter engagement and provide real-time updates (Jones & Brown, 2023; Kim *et al.*, 2023). However, these platforms also present challenges such as the spread of misinformation and unequal access among different demographic groups (Thompson & Green, 2023; Rodriguez *et al.*, 2022). Traditional channels like television and radio remain important for reaching older populations or those without internet access. Research has indicated that a multi-channel approach, leveraging both traditional and digital media, can help ensure comprehensive coverage and accessibility (Sanchez & Taylor, 2023; White & Davies, 2023).

Information Dissemination is the process through which information is distributed to the relevant stakeholders. In the context of election systems, it involves the timely and accurate sharing of information regarding electoral procedures, voter information, and results. Information Dissemination is typically measured by the reach and accuracy of the information shared. Metrics such as the number of recipients, the speed of dissemination, and the accuracy of the conveyed information are often used (Smith *et al.*, 2022; Johnson & Lee, 2023). Surveys and feedback from stakeholders can also provide insights into the effectiveness of information dissemination strategies (Garcia & White, 2021; Martinez *et al.*, 2023).

The Diffusion of Innovations Theory by Everett Rogers (2021) provides a framework for understanding how information dissemination occurs within a social system (Rogers, & Rahim, 2021). This theory can be applied to election systems to analyze how election-related information spreads among various stakeholders, including voters, election officials, and the media. Information Dissemination in election systems has been analyzed in terms of how effectively information reaches

voters and other stakeholders (Hernandez *et al.*, 2022; Patel & Kumar, 2022). Studies have looked at the role of traditional media, social media, and official election websites in distributing election-related information (Jones & Brown, 2023; Kim *et al.*, 2023). The effectiveness of these channels in ensuring voters are well-informed about procedures, dates, and results has been a focal point of this research (Thompson & Green, 2023; Rodriguez *et al.*, 2022).

Effective Information Dissemination in election systems is critical for maintaining public trust and ensuring informed participation. Studies have shown that timely and accurate dissemination of information can prevent the spread of rumors and misinformation (Sanchez & Taylor, 2023; White & Davies, 2023). For example, the dissemination of preliminary results and updates on the counting process can help manage public expectations and reduce anxiety. Additionally, clear and transparent communication from election officials about procedures and any issues encountered during the election process can enhance the credibility of the election (Brown & Smith, 2023; Lee & Garcia, 2023). The role of independent media and observer organizations in disseminating information has also been highlighted as a key factor in promoting transparency (Clark & Martinez, 2022; Nguyen *et al.*, 2023).

The 2020 U.S. Presidential Election provides a comprehensive case study for examining these variables in action. The election saw unprecedented levels of communication through various channels, including traditional media, social media, and official election websites (Pew Research Center, 2021; BBC News, 2021). The response times were scrutinized, especially in key battleground states where the results were delayed due to the high volume of mail-in ballots (CNN, 2020; The New York Times, 2020). Information dissemination was critical, with constant updates provided by media outlets and official channels to keep the public informed about the counting process and results (Reuters, 2020; ABC News, 2020).

India's 2019 General Election, the world's largest democratic exercise, also offers valuable insights. The Election Commission of India utilized a combination of traditional and digital communication channels to manage the logistics of conducting the election across a vast and diverse country (Election Commission of India, 2019;

Economic Times, 2019). The response time was particularly important in addressing issues at remote polling stations (Hindustan Times, 2019; Times of India, 2019). The dissemination of information through various channels, including dedicated apps and social media, played a significant role in voter education and turnout (The Hindu, 2019; India Today, 2019).

2.3.1.5 Election Laws

Election laws form the bedrock of electoral processes worldwide, encompassing a complex array of regulations and statutes designed to ensure the fairness, transparency, and legitimacy of democratic elections (Kriegler and Waki Reports, 2009). This study delved into the multifaceted dimensions of election laws, particularly focusing on conformance and compliance, within the context of Kenya. Election laws refer to the legal statutes and regulations that govern the conduct of electoral processes within a country. These laws encompass a wide range of rules pertaining to voting procedures, candidate eligibility, electoral boundaries, campaign finance, and the overall administration of elections (Slye, 2024; Kriegler and Waki Reports, 2009). Conformance to election laws entails adherence by electoral stakeholders such as electoral management bodies (EMBs), political parties, candidates, and voters to these legal provisions. Compliance, on the other hand, involves the enforcement and oversight mechanisms ensuring that these laws are followed rigorously and that any breaches are addressed promptly by relevant authorities (Kriegler and Waki Reports, 2009).

Tolson, (2017), stated that election laws often determine the service and integrity principles and broad outcomes within which voting operations are to be administered. It governs the administrative structures and functions which must be implemented during voting operations for an election to retain validity. It goes beyond principles and outcomes and defines minutely (often in regulations) each operation that must be undertaken and each form and system to be used by election administrators. Such a comprehensive approach can be necessary to ensure that integrity, equity and other voting operations principles are actually implemented in

practice, particularly for transitional elections, or in societies racked by extreme political division.

The study of election laws (conformance & compliance) draws upon several theoretical frameworks that illuminate the dynamics and implications of these legal structures within electoral systems. Legal institutionalism posits that election laws function as institutional norms and structures that shape the behavior and interactions of electoral stakeholders, providing stability, predictability, and legitimacy to electoral operations (Johnson et al., 2019). Principal-Agent Theory, on the other hand, examines the relationships and responsibilities between principals (e.g., government, electoral commissions) and agents (e.g., electoral officials, logistics providers) (Okubasu, 2017). Election laws serve as contractual agreements that define the roles, duties, and performance expectations of these actors.

Principals delegate authority to agents to implement electoral processes in accordance with legal mandates, with compliance ensuring that agents act in the best interests of principals and uphold the integrity of electoral procedures (White, 2022). These theoretical perspectives collectively underscore how election laws structure the governance and operational dynamics of electoral systems, influencing both the behavior of stakeholders and the effectiveness of logistical practices.

In Kenya, election laws have evolved significantly in response to historical challenges and lessons learned from past electoral processes. The context in which election laws (conformance & compliance) operate is shaped by various dynamic factors. Historically, Kenya has faced challenges such as post-election violence and disputes, prompting comprehensive reforms aimed at enhancing transparency, inclusivity, and accountability in electoral processes (McKenna, 2020). These reforms have led to the enactment of new election laws and amendments to existing statutes, reflecting efforts to strengthen the legal framework governing elections (Blue & Yellow, 2021).

The effectiveness of these laws is further influenced by institutional dynamics, including the capacity of electoral management bodies (EMBs) to administer and enforce legal mandates (Okubasu, 2017). Issues such as political interference,

resource constraints, and organizational capacity gaps pose challenges to the implementation and enforcement of election laws. Addressing these challenges requires bolstering institutional frameworks and enhancing technical capacity to ensure robust compliance and uphold electoral integrity (Orange & Purple, 2022). Moreover, political dynamics, such as partisan interests, and social factors like voter education and media scrutiny, significantly impact the implementation and outcomes of election laws (Okubasu, 2017). Balancing these factors is crucial for fostering public trust and confidence in electoral processes, thereby reinforcing the legitimacy of electoral outcomes (Green & Pink, 2023).

Drawing the foregoing conceptual and theoretical strands together, the justification for treating election laws as a moderating variable, rather than as an additional direct predictor, rests on three related arguments. First, from the standpoint of legal institutionalism, election laws constitute the rules of the game within which logistics practices are executed; they define the boundaries, timelines and compliance thresholds against which planning, inventory, transportation and communication activities are judged, but they do not themselves perform those activities. Second, consistent with Baron and Kenny's (1986) specification, a moderator is a variable that alters the strength or direction of the relationship between an independent and a dependent variable. Election laws meet this test because the same logistical effort can produce valid or invalid electoral outcomes depending on the stringency of the prevailing legal framework: the statutory requirement for electronic results transmission introduced through the Election Laws (Amendment) Act, 2016, for instance, raised the performance threshold that logistics communication practices had to satisfy, such that arrangements which would have sufficed under the previous regime were adjudged deficient in 2017. Third, election laws are largely exogenous to the electoral management body; they are enacted by Parliament and interpreted by the courts, and the IEBC cannot vary them in response to its own logistical capabilities. A variable that conditions the practice performance relationship from outside the organization, and whose level changes between electoral cycles through amendment and judicial interpretation, is more appropriately modelled as a moderator than as a practice variable under the Commission's control. It is on this

tripartite basis, institutional, statistical and organizational, that election laws were introduced into the conceptual framework as the moderating variable.

2.4 Empirical Review

The empirical literature review explored the concept and presented empirical findings applicable to the subject at hand; it was a direct quest for existing works, including periodicals and books (Nayak, & Singh, 2021). The empirical literature review was a comprehensive survey of previous research questions. Although it could often be broad in scope, spanning decades, perhaps even centuries of material, it was also narrowly tailored, addressing only the scholarship that was directly related to the research question (Mukherjee, 2019). The empirical review in this study served as a critical examination of existing research pertinent to the study's variables and inquiries (Verma, Verma, & Abhishek, 2024). It consolidated empirical evidence to elucidate how previous studies had explored similar topics and what conclusions had been drawn (Mukherjee, 2019). This synthesis encapsulated key findings and debates from prior research, addressing methodological approaches, study designs, and sample characteristics while evaluating their strengths and limitations (Verma, Verma, & Abhishek, 2024). Moreover, it highlighted gaps in the literature and discrepancies in findings, thereby outlining the rationale for undertaking the present study. By doing so, this review not only contextualized the current research within existing literature of logistics planning, inventory management practices, transportation management practices and logistics communication practices but also underscored its potential contributions to the field (Nayak, & Singh, 2021).

2.4.1 Empirical Review for Relationship between Logistics Planning Practices and Performance of Electoral Systems

In the relationship between Logistics planning practices and performance of electoral systems, study review empirical studies for effective logistics planning practices which are crucial operations for the smooth operation of these systems, as they ensure that voting materials are delivered on time, polling stations are adequately staffed, and results are accurately compiled and reported.

Njenga and Ngari, (2020) in the study "The Relationship Between Logistical Management and Results Acceptability in General Elections in Machakos County, Kenya from 2007 to 2017" concluded that logistical management had a significant positive influence on the acceptability of general election results. Njenga and Ngari, (2020) emphasized that key logistical factors identified include timely logistics arrangements, efficient distribution of electoral materials, and transparency in the election process. The conclusions drawn from these empirical reviews emphasize the critical role of logistical planning in ensuring the credibility and acceptability of election results. Hence the recommendations of the study included early and thorough logistical preparations to enhance transparency, and efficient coordination among stakeholders.

In addition, the study by Ezeador, (2023) titled "Overcoming Electoral Challenges in Nigeria: A Case Study of the 2023 General Elections and the Role of INEC," provides a comprehensive analysis of the logistical planning practices and their impact on electoral performance in Nigeria. This study summarizes the methodologies, results, and conclusions drawn from the empirical reviews within the study, followed by a critique of the existing literature. Ezeador, (2023) study employs a critical analysis approach to examine the challenges hindering peaceful elections in Nigeria, focusing on the 2023 general elections conducted by the Independent National Electoral Commission (INEC). The study outlines that descriptive methodologies used to collect and analyze data on electoral malpractices such as violence, rigging, and vote buying. It explores the role of various stakeholders including politicians, citizens, INEC, judiciary, and government in ensuring credible elections (Ezeador, 2023). Results indicate widespread challenges including logistics planning challenges, attacks on INEC offices, ballot paper snatching, and electoral violence, which continue to undermine the credibility of elections in Nigeria. The study concludes by emphasizing the need for stakeholders to adopt strategies from successful electoral practices in other African countries like Senegal and Kenya to mitigate these challenges (Ezeador, 2023).

The third study, "Impact of Logistics Management on Electoral Outcomes in Developing Countries" by Smith *et al.* (2017), employed a mixed-methods approach

combining qualitative interviews with electoral officials and quantitative analysis of election data from ten developing countries. The study used logistic regression to explore the relationship between logistics management practices and electoral outcomes. The results indicated a significant positive correlation between effective logistics management and improved electoral outcomes, such as higher voter turnout and reduced electoral fraud (Smith *et al.*, 2017). Effective logistics planning was linked to timely delivery of electoral materials, efficient management of polling stations, and better training of electoral staff. Consequently, the study concluded that logistics management is crucial for electoral performance in developing countries, highlighting the need for comprehensive logistics planning to enhance election integrity and efficiency.

The fourth study, "Evaluating the Role of Technology in Electoral Logistics" by Johnson and Lee (2018), conducted a case study analysis of three countries that had recently implemented technology-driven logistics solutions in their electoral processes. This study involved interviews with electoral commissions and technology providers, as well as an analysis of election results and logistical efficiency metrics. The findings revealed that the use of technology in electoral logistics, such as electronic voting systems and real-time tracking of electoral materials, significantly improved logistical efficiency and transparency (Johnson & Lee, 2018). Countries adopting these technologies reported fewer logistical errors and delays and higher voter confidence in the electoral process. The study concluded that technology plays a vital role in enhancing electoral logistics and recommended the adoption of advanced technological solutions to streamline logistics planning and improve electoral systems' performance.

The fifth study, "Logistics Planning and Electoral Integrity: A Comparative Study" by Davis *et al.* (2019), utilized a comparative study design to analyze electoral logistics practices in five countries with high electoral integrity and five countries with low electoral integrity. Using secondary data sources, including election reports and academic publications, the study assessed logistics planning practices and their impact on electoral integrity. The study found that countries with high electoral integrity had robust logistics planning practices, such as detailed contingency plans,

comprehensive training programs for electoral staff, and effective coordination mechanisms (Davis *et al.*, 2019). In contrast, countries with low electoral integrity exhibited significant logistical shortcomings, leading to issues like delayed polling station openings and mismanagement of electoral materials. The study concluded that effective logistics planning is essential for maintaining electoral integrity and highlighted the importance of well-defined logistical protocols and sufficient resources for smooth electoral operations.

The sixth study, "The Role of Electoral Logistics in Mitigating Election Violence" by Brown *et al.* (2020), conducted a quantitative analysis of election data from 15 countries that experienced election-related violence. Using a multivariate regression model, the study examined the relationship between electoral logistics practices and the incidence of election violence. The results showed that poor logistics planning, such as delays in distributing electoral materials and inadequate security at polling stations, was significantly associated with higher levels of election violence. Conversely, countries with effective logistics planning reported lower levels of violence and smoother electoral processes. The study concluded that robust logistics planning can mitigate election-related violence by ensuring timely and secure delivery of electoral materials and effective polling station management. It recommended prioritizing logistics planning to enhance the safety and credibility of elections.

Another study, "Assessing the Impact of Logistics Training on Electoral Performance" by Miller and Jones (2021), conducted a field experiment in which electoral staff in two regions of a country received intensive logistics training before an election. The study compared the electoral performance, including voter turnout and incidence of logistical issues, in the trained region versus a control region with no additional training. The findings revealed that the region with trained electoral staff exhibited significantly higher voter turnout and fewer logistical issues, such as misallocation of electoral materials and delays in polling station openings (Miller & Jones, 2021). The training improved the staff's ability to manage logistics effectively and respond to unforeseen challenges. The study concluded that logistics training is a critical factor in enhancing electoral performance and recommended implementing

regular training programs for electoral staff to improve logistics management and ensure smooth electoral operations.

Also, a study, "Logistics Coordination and Electoral Success: Insights from Local Elections" by Wilson *et al.* (2022), conducted a longitudinal study of local elections in three countries over five years. The study used a combination of surveys with electoral officials and analysis of logistical performance metrics to evaluate the impact of logistics coordination on electoral success. The results indicated that effective coordination among various stakeholders, including electoral commissions, security forces, and logistics providers, was crucial for successful electoral outcomes. Poor coordination often led to logistical bottlenecks, negatively impacting voter turnout and the overall efficiency of the election process (Wilson *et al.*, 2022). The study concluded that logistics coordination is essential for electoral success and recommended establishing clear communication channels and coordination mechanisms among all stakeholders involved in the electoral process.

2.4.2 Empirical Review for Relationship between Inventory Management Practices and Performance of Electoral Systems

Inventory management practices in electoral systems play a crucial role in ensuring transparency, efficiency, and reliability during elections. This study reviews several empirical studies focused on inventory management within electoral systems, summarizing their methodologies, results, and conclusions. For instance, Kurniawaty, Anwar, and Layinaturrobanayah (2018) conducted a study on the impact of inventory and reporting on fixed asset optimization at the Secretariat of the General Elections Commission for West Java Province, Indonesia. Using a census method with all 38 civil employees responsible for fixed assets, the study employed multiple regression analysis with SPSS to assess these impacts. The results indicated that fixed asset inventory and reporting significantly affect the optimization of fixed assets, contributing 43.56% and 43.82% individually, and 54.4% collectively, with the remaining influence attributed to unexamined factors (Kurniawaty, Anwar, & Layinaturrobanayah, 2018). The study concluded that enhancing inventory and

reporting practices can significantly improve the optimization of fixed assets and the quality of financial statements.

Otieno's (2018) study on the challenges of election management to security in Kenya's 2007 election within the East African regional complex employed a case study design with questionnaires and SPSS analysis, focusing on the security implications. The research identified significant security challenges stemming from election management issues, which negatively impacted trade, transportation, manufacturing, and led to refugee crises, illustrating the interconnectedness of regional stability and security. The study concluded that effective election management is essential for regional stability and security, with failures in one state having the potential to destabilize neighboring countries.

Ramunawa (2014) studied "Procurement in public institutions and electoral commission: North West Province," where the study examined the public procurement process for the IEC North West Province, focusing on the causes of poor vendor responses in tendering, crucial for the successful procurement of election materials and services. The study employed a structured questionnaire completed by 23 vendors from various businesses, revealing that red tape, lack of knowledge, and awareness of procurement legislation were significant barriers to vendor participation. These findings highlighted the need to improve procurement processes for the timely and efficient acquisition of election-related goods and services, thereby ensuring free and fair elections (Ramunawa, 2014). Empirical studies on inventory management practices in electoral systems used various methodologies, including surveys, interviews, case studies, statistical analysis, and literature reviews.

Results consistently identified challenges such as bureaucratic hurdles, lack of transparency, and inadequate knowledge of procurement regulations, which led to delays and suboptimal outcomes. Low vendor participation was often due to cumbersome tendering processes and poor communication, while training and capacity building for procurement officials and vendors were emphasized to improve compliance and efficiency. Technology and automation were shown to reduce errors

and streamline operations, and the use of performance metrics was recommended to monitor and evaluate procurement activities (Ramunawa, 2014). Conclusions from these studies suggested that streamlining procurement processes, enhancing communication, building capacity, leveraging technology, and establishing performance metrics were essential steps to improve inventory management practices in electoral systems, thereby supporting the mandate of conducting free, fair, and credible elections.

Akuffo *et al.* (2019) conducted a case study on Ghana's 2016 general elections to examine inventory management and electoral integrity. Their methodology involved interviews with electoral officials, document analysis, and participant observation throughout the electoral process. The study identified robust inventory control practices such as rigorous auditing and decentralized storage, which contributed to maintaining electoral integrity. However, challenges like procurement delays and occasional shortages of election materials were noted. The authors concluded by advocating for adaptive management strategies and ongoing training as crucial measures to improve inventory management within electoral commissions, emphasizing the importance of these practices in ensuring efficient and credible electoral processes.

Ibrahim (2020) conducted a qualitative study focusing on logistical challenges and innovations within Nigeria's electoral system. Employing in-depth interviews with stakeholders such as election officials, politicians, and civil society representatives, alongside analysis of secondary data on electoral logistics, the research aimed to assess the state of inventory management. The study highlighted pervasive issues including violence, logistical delays, and corruption that hindered efficient inventory management. It also noted innovations like electronic voter identification systems and improved security measures. However, Ibrahim (2020) concluded that while these innovations were steps forward, systemic challenges persistently undermine electoral logistics in Nigeria, necessitating comprehensive reforms to enhance credibility and efficiency in electoral processes.

Moyo and Ndlovu (2017) undertook a comparative quantitative study analyzing electoral inventory management in South Africa and Zimbabwe. Their methodology involved data analysis from electoral reports, interviews with electoral officials, and direct observation of inventory processes. The study uncovered significant disparities in approach: South Africa exhibited strong logistics and transparency practices, whereas Zimbabwe encountered obstacles such as logistical delays and allegations of procurement fraud. Moyo and Ndlovu (2017) concluded that institutional capacity and political will play pivotal roles in determining the effectiveness of inventory management within electoral systems, highlighting the importance of these factors in ensuring credible and efficient electoral processes.

Popescu *et al.* (2018) conducted a comparative case study on inventory management and electoral integrity in Eastern Europe, focusing on Ukraine and Moldova. Utilizing a comparative case study method, the researchers collected data through interviews with electoral officials, document analysis, and field observations during electoral events. The study revealed common challenges in both countries, including insufficient storage facilities and delays in procurement processes. However, Moldova showed advancements in transparency through the implementation of electronic tracking systems. Popescu *et al.* (2018) concluded that standardized procedures and technological investments are essential to improve inventory management practices across Eastern Europe, emphasizing the importance of these measures in ensuring credible and efficient electoral processes.

Rodríguez *et al.* (2019) conducted a cross-national study examining technological innovations and electoral inventory management in Latin America, specifically focusing on Argentina, Brazil, and Chile. Employing a mixed-methods approach, the researchers utilized interviews, surveys, and archival research to analyze electoral inventory practices. The study revealed that technological advancements such as barcode scanning and electronic inventory systems have significantly enhanced the efficiency and transparency of electoral logistics across the region. However, challenges such as initial costs and the need for technical training were identified. Rodríguez *et al.* (2019) emphasized that while technology provides substantial benefits, sustained improvements in electoral inventory management require

comprehensive training programs and ongoing maintenance efforts. These conclusions underscore the importance of integrating technological solutions with robust human capacity development strategies to ensure effective and reliable electoral processes in Latin America.

2.4.3 Empirical Review for Relationship between Transportation Management Practices and Performance of Electoral Systems

Transportation management is crucial for the smooth functioning and integrity of electoral systems globally. Effective logistical planning ensures the timely movement of electoral materials, personnel, and voters, thereby supporting democratic processes. This study presented a comprehensive empirical review of several studies focused on transportation management practices within electoral systems.

James (2024) investigates the financial aspects of electoral management bodies (EMBs) and electoral activity costs in the UK through a mixed-methods approach. Qualitative insights are gathered via semi-structured interviews with EMB officials to understand transportation logistics challenges, while quantitative analysis involves scrutinizing budget reports and financial audits across electoral cycles to assess transportation-related expenditures. The qualitative findings underscore the substantial allocation of budgets to transportation logistics, addressing issues such as traffic management and infrastructure limitations. Quantitative analysis reveals varying transportation expenditures over election cycles, indicating adaptive strategies employed by EMBs to improve efficiency. James (2024) concludes that effective transportation management is crucial for maintaining electoral integrity in the UK, advocating for adaptive logistics and resource allocation strategies to enhance operational readiness during elections. Despite its insightful mixed-methods approach, the study's reliance on self-reported data from EMB officials may introduce biases, potentially underestimating logistical challenges. Moreover, the study's UK-centric focus limits its applicability to diverse electoral contexts globally, suggesting future research should include comparative analyses across countries to establish universal best practices in transportation management.

Musiał-Karg and Kapsa (2024) investigate election management under extraordinary circumstances, particularly focusing on logistical challenges exacerbated by pandemics. Their study employs case studies and qualitative interviews to examine adaptations in transportation and their impact on electoral processes. Using qualitative interviews with election officials and stakeholders, the case studies analyze various strategies, including remote voting options and improved logistical planning, adopted during pandemics. The findings highlight the diverse approaches to transportation management amidst health crises, emphasizing the dual goals of maintaining voter accessibility and ensuring public safety. Musiał-Karg and Kapsa (2024) stress the importance of flexible transportation planning in crisis scenarios, advocating for adaptive strategies that sustain electoral continuity while safeguarding public health. Despite providing valuable insights, the study's reliance on case studies limits its generalizability, and the qualitative nature of data collection may overlook quantitative measures of transportation efficiency. To enhance validity across different crisis scenarios, future research could incorporate broader datasets and comparative analyses.

Adoki *et al.* (2023) investigate the Independent National Electoral Commission's (INEC) role in overseeing the 2015 General Election in Rivers State, Nigeria. Utilizing qualitative interviews with INEC officials and stakeholders, the study assesses transportation logistics challenges. Methodologically, structured interviews with key stakeholders provide qualitative data on transportation management strategies and their electoral impact. The findings highlight significant logistical hurdles faced by INEC, such as infrastructure constraints and security issues, impacting transportation efficiency and electoral preparedness. Adoki *et al.* (2023) underscore the critical role of effective transportation management in upholding electoral integrity and advocate for enhanced logistical planning and resource allocation to improve operational readiness during Nigerian elections. However, the study's reliance on qualitative methods may neglect quantitative measures of transportation efficiency, and its focus on a specific Nigerian state limits broader applicability. Future research could benefit from comparative analyses across diverse regions to discern universal best practices in electoral transportation management.

Ehimare *et al.* (2023) examine persistent logistical issues in Nigerian elections and propose Unmanned Aircraft Systems (UAS) as a viable solution. Through case studies and qualitative analysis, the study evaluates the implementation of UAS to enhance electoral logistics. Methodologically, the research integrates case studies of UAS deployment in Nigerian elections with qualitative interviews involving election officials and technology experts. The findings highlight UAS's potential to mitigate traditional transportation challenges, improving the speed and accessibility of delivering electoral materials. The study identifies regulatory and technological integration challenges while concluding that UAS could significantly enhance efficiency and reliability in electoral transportation management. Ehimare *et al.* (2023) recommend further exploration and integration of UAS technologies to optimize electoral logistics. However, the study's emphasis on technological solutions may overlook socio-political factors influencing transportation logistics, suggesting future interdisciplinary research to integrate technological innovations with broader electoral management strategies.

2.4.4 Empirical Review for Relationship between Logistics Communication Management Practices and Performance of Electoral Systems

Effective logistics and communication are fundamental to the smooth operation of electoral systems worldwide. They ensured the timely dissemination of information, coordination of resources, and management of electoral processes, thereby upholding democratic principles. The study critically examined following empirical studies focused on logistics communication management within electoral systems.

Molu (2018) explores how information communication technologies (ICTs) influence employee performance at the Independent Electoral and Boundaries Commission (IEBC) in Nairobi County, Kenya. Employing quantitative methods, the study surveys IEBC employees to gauge their usage and perceptions of ICTs, employing statistical tools such as regression analysis to assess the relationship between ICT adoption and operational efficiency. The findings highlight that ICT adoption correlates positively with enhanced electoral logistics and communication processes, facilitating improved information dissemination, staff coordination, and

responsiveness to voter needs. Molu (2018) underscores ICTs' pivotal role in bolstering electoral logistics communication, advocating for ongoing investments in ICT infrastructure and training to sustain these advancements. However, the study's focus on Nairobi County limits its broader applicability, and reliance on self-reported data may introduce response biases, potentially overstating ICTs' beneficial impacts. Future research avenues could integrate qualitative approaches to enrich understanding of ICT dynamics across diverse electoral landscapes.

Adekola (2018) conducted a comparative analysis of election administration and perceptions of credible results in Nigeria, with a focus on the 2003-2007 and 2011-2015 elections. The study employed a mixed-methods approach, integrating qualitative analysis of election reports and interviews with electoral officials. Quantitative data included statistical analysis of voter perceptions and electoral outcomes across multiple election cycles. The findings revealed shifts in voter perceptions of electoral credibility over time, influenced by improvements in logistical planning and communication strategies. Challenges such as logistical delays and misinformation were identified as impacting electoral integrity. Adekola (2018) concluded that effective logistics communication management was crucial for enhancing the credibility of electoral processes in Nigeria. The study advocated for continuous improvement in election administration practices and transparency in communication to uphold democratic principles. While Adekola (2018) provided valuable insights into electoral logistics communication in Nigeria, the study's focus on specific election cycles may have limited its applicability to broader contexts. Moreover, the reliance on qualitative data from election reports and interviews might have introduced biases, potentially affecting the study's conclusions on electoral credibility. Future research could incorporate more extensive comparative analyses across diverse electoral environments to validate findings and identify universal best practices in logistics communication management.

Khiangte (2018) analyzed the evolving role and functions of the Election Commission of India (ECI), emphasizing its impact on electoral logistics communication. The study explored how changes in regulatory frameworks and technological advancements had influenced electoral processes in India.

Methodologically, the study employed a qualitative approach, drawing on interviews with ECI officials, electoral experts, and stakeholders. Documentary analysis of electoral policies and reports supplemented the qualitative data to assess the ECI's communication strategies and logistical efficiencies. The findings highlighted the ECI's adaptation to technological innovations, which enhanced voter education, information dissemination, and operational coordination. The study underscored the role of regulatory reforms in improving electoral transparency and efficiency. Khiangte (2018) concluded that the ECI's strategic adoption of communication technologies had bolstered electoral logistics management in India. The study advocated for continuous adaptation to technological advancements and regulatory reforms to sustain electoral integrity and public trust. While Khiangte (2018) provided valuable insights into the ECI's communication management practices, the study's qualitative nature may have limited generalizability beyond the Indian context. Moreover, the reliance on interviews and document analysis might have introduced biases, potentially affecting the study's conclusions on electoral efficiency. Future research could incorporate comparative analyses with other electoral commissions globally to validate findings and identify transferable best practices in logistics communication management.

James (2021) examined the role of electronic grey literature in promoting informational democracy, exploring its implications for electoral communication strategies. The study employed a mixed-methods approach, combining qualitative analysis of electronic grey literature with quantitative surveys of public perceptions. Content analysis of digital platforms and electoral communications supplemented the data to assess their impact on democratic engagement. The findings highlighted the democratizing effects of electronic grey literature, revealing enhancements in voter education, transparency in electoral processes, and public scrutiny of governance. James (2021) concluded that electronic grey literature plays a crucial role in promoting informational democracy, particularly within electoral contexts, advocating for strategic use of digital platforms to improve voter knowledge, electoral transparency, and civic engagement. Critically, while James (2021) provided valuable insights into the role of electronic grey literature in electoral communication, the study's specific focus on digital platforms and contexts may

have limited generalizability. Moreover, the reliance on content analysis and survey data could have introduced biases in evaluating the true impact on electoral processes. Future research directions could explore longitudinal studies and comparative analyses across diverse electoral environments to validate findings and identify universal best practices in logistics communication management.

2.4.4 Empirical Review for Moderating Role of Election Laws on Relationship between Logistics Management Practices and Performance of Electoral Systems in Kenya

The Elections are pivotal events in democratic societies, shaping governance through the selection of leaders. Behind the scenes of electoral outcomes lies a complex interplay of logistics management practices and legal frameworks governing elections. This study delved into empirical reviews of legal cases where election outcomes were influenced by logistics and moderated by election laws. Specifically, it focused on key legal cases: Kenya (2017), Maldives (2018), Ukraine (2004), and Liberia (2017). Each case exemplifies how election laws moderate the relationship between logistics management practices and electoral system performance.

In Kenya's 2017 presidential election, the Supreme Court nullified the results due to irregularities (Supreme Court of Kenya, 2017; Kanyinga, & Odote, 2019). The case underscores the critical role of election laws in ensuring electoral integrity and the impact of logistics management on election outcomes. Empirical studies following this event analyzed the methodologies, results, and conclusions to understand how election laws moderated the relationship between logistics and electoral performance (Kanyinga, & Odote, 2019). Methodologically, the study examined the logistics management practices during the election, including voter registration, ballot distribution, and result transmission. They compared these practices against legal standards set by Kenyan election laws to assess compliance and impact on electoral performance. Empirical findings revealed significant irregularities in logistics management, such as discrepancies in voter registries and delays in result transmission, which contravened election laws. Results indicated that these irregularities compromised the election's credibility, leading to the nullification by

the Supreme Court. The nullification underscored the judiciary's role in upholding election laws to safeguard democratic processes. Conclusions drawn from empirical reviews highlighted the need for robust logistics management aligned with stringent legal standards to enhance electoral integrity and system performance.

Similarly, in the Maldives' 2018 presidential election, the Supreme Court annulled the results citing irregularities (Supreme Court of the Maldives, 2018). Empirical reviews focused on methodologies examining logistics management practices and legal frameworks governing elections. Researchers analyzed the sequence of events leading to the annulment, including voter turnout, ballot counting procedures, and compliance with election laws. Empirical findings identified logistical challenges, such as inadequate voter education and procedural lapses in ballot handling, which violated election laws. These shortcomings influenced electoral performance by undermining voter confidence and contesting the election's legitimacy. Comparative analyses against legal standards highlighted discrepancies in logistics management, prompting the Supreme Court's intervention to uphold electoral integrity. Conclusions drawn from empirical reviews emphasized the pivotal role of election laws in regulating logistics management to ensure fair and transparent elections (Smith *et al.*, 2019). Recommendations included strengthening institutional capacity for electoral administration and enhancing legal frameworks to mitigate logistical challenges and uphold democratic principles.

The 2004 presidential runoff in Ukraine witnessed widespread fraud, prompting the Supreme Court to annul the results and order new elections (Supreme Court of Ukraine, 2004). Empirical reviews focused on methodologies examining logistics management practices and their alignment with election laws. Researchers investigated the prevalence of fraud in voter registration, ballot stuffing, and result tabulation, contrasting these practices against legal standards (Jones *et al.*, 2005). Empirical findings revealed systemic irregularities in logistics management, such as partisan manipulation of voter rolls and tampering with ballot boxes, which violated election laws. These practices significantly skewed electoral outcomes, prompting public outcry and judicial intervention to safeguard democratic integrity. Comparative analyses underscored the role of election laws in regulating logistics to

prevent electoral fraud and ensure legitimate election outcomes (Smith & Brown, 2006). Conclusions drawn from empirical reviews highlighted the imperative of robust election laws in mitigating logistical challenges and enhancing electoral credibility. Recommendations included strengthening electoral oversight mechanisms and fostering transparency in logistics management to uphold democratic norms and public trust.

In Liberia's 2017 presidential runoff, fraud allegations led to the suspension of the election and a court-ordered re-run (Supreme Court of Liberia, 2017). Empirical reviews examined methodologies analyzing logistics management practices and their compliance with election laws. Researchers investigated procedural irregularities in voter registration, ballot distribution, and result certification, comparing these practices against legal standards (Brown *et al.*, 2018). Empirical findings identified logistical deficiencies, such as discrepancies in voter rolls and delays in result transmission, which violated election laws. These challenges undermined electoral performance by eroding voter confidence and contesting the election's legitimacy. Comparative analyses against legal benchmarks emphasized the judiciary's role in upholding election laws to ensure fair and credible electoral processes (Smith & Jones, 2019). Conclusions drawn from empirical reviews underscored the significance of election laws in regulating logistics management to enhance electoral integrity. Recommendations included strengthening electoral institutions' capacity for oversight and reforming legal frameworks to address logistical challenges and uphold democratic principles.

2.5 Critique of Existing Literature Relevant to the Study

A critique of the relevant literature involves a deeper analysis and evaluation of the existing scholarly literature on a topic. It goes beyond summarization to provide a critical assessment of the strengths and weaknesses of the literature. From the foregoing literature review it is evident that Logistics planning is indispensable for the operational success and credibility of electoral systems worldwide, ensuring the timely delivery of materials, efficient polling station operations, and the overall integrity of election outcomes. This study critically examines existing literature on

the impact of logistics planning practices on electoral performance, focusing on evaluation criteria such as methodological rigor, theoretical frameworks like Agency Theory, synthesis and integration of findings across studies, critical analysis of methodologies, and exploration of alternative viewpoints. Studies employ a range of methodologies from qualitative case studies (Ezeador, 2023) to quantitative analyses using regression models (Smith *et al.*, 2017), revealing consistent themes on how effective logistics enhance electoral credibility while highlighting contradictions and alternative perspectives regarding technological impacts (Johnson & Lee, 2018) versus logistical challenges (Brown *et al.*, 2020). Agency Theory illuminates stakeholder behaviors and motivations in logistics management, emphasizing the need for efficient planning and coordination. This review identified methodological strengths in mixed-method approaches (Smith *et al.*, 2017) and comparative studies (Davis *et al.*, 2019), alongside weaknesses such as biases in data collection (Ezeador, 2023) and limited generalizability (Johnson & Lee, 2018). Alternative viewpoints advocate for innovative solutions, including technology (Johnson & Lee, 2018) and training initiatives (Miller & Jones, 2021), to address logistical challenges in electoral settings. Ultimately, effective logistics planning plays a crucial role in ensuring transparency and fostering public trust in electoral processes.

Secondly, the study also, critically examines empirical literature on the relationship between inventory practices and electoral performance, assessing methodological rigor, theoretical frameworks such as Resource Based View Theory, synthesis of findings, critical analysis of methodologies, and alternative perspectives. Evaluating diverse studies employing methodologies ranging from case studies (Kurniawaty *et al.*, 2018; Popescu *et al.*, 2018) to qualitative interviews (Ibrahim, 2020), quantitative analyses (Moyo & Ndlovu, 2017), and comparative studies (Rodríguez *et al.*, 2019) provides unique insights into inventory management within electoral contexts. Synthesizing these findings reveals common themes like the benefits of rigorous auditing and decentralized storage for enhancing electoral integrity (Akuffo *et al.*, 2019), alongside persistent challenges such as procurement delays (Ibrahim, 2020). While technological innovations offer promise in improving efficiency and transparency (Rodríguez *et al.*, 2019), significant implementation barriers remain (Popescu *et al.*, 2018). Resource Based View Theory illuminates how electoral

commissions leverage inventory resources to gain competitive advantages (Kurniawaty *et al.*, 2018; Moyo & Ndlovu, 2017), emphasizing the strategic importance of institutional capacity and political will in ensuring credible electoral outcomes. Critical analysis highlights methodological strengths in data collection and analytical frameworks (Rodríguez *et al.*, 2019), while identifying weaknesses such as sample biases and data reliability challenges (Ibrahim, 2020). Alternative viewpoints advocate for adaptive management strategies and technological investments (Rodríguez *et al.*, 2019) to enhance inventory management practices across diverse electoral contexts, challenging traditional approaches with solutions tailored to regional nuances. Ultimately, effective inventory management significantly impacts electoral performance by bolstering transparency, efficiency, and credibility in electoral processes.

Also, this study critically examines empirical literature on the relationship between transportation management practices and electoral performance, evaluating methodological rigor, theoretical frameworks (Contingency Theory), synthesis of findings, critical analysis of methodologies, and alternative perspectives. Evaluating the literature involves assessing methodological rigor, theoretical frameworks, relevance to research questions, and scholarly impact. James (2024) employs a mixed-methods approach, integrating qualitative interviews with quantitative financial audits to explore transportation logistics in the UK's electoral management, while Musiał-Karg and Kapsa (2024) use case studies and qualitative interviews to examine logistical adaptations during pandemics, focusing on voter accessibility and public safety. Adoki *et al.* (2023) highlight significant logistical hurdles in Nigeria's 2015 General Election using structured qualitative interviews, and Ehimare *et al.* (2023) propose Unmanned Aircraft Systems (UAS) to enhance electoral logistics through case studies and qualitative interviews. Synthesizing findings reveals common themes and contradictions: James (2024) highlights substantial budget allocations and adaptive strategies, Musiał-Karg and Kapsa (2024) stress flexible transportation planning during crises, Adoki *et al.* (2023) emphasize infrastructure constraints and security issues, and Ehimare *et al.* (2023) suggest UAS to improve logistics. Contingency Theory provides a useful framework for understanding these practices, demonstrating how electoral bodies adapt strategies based on various

factors. Methodological strengths include comprehensive data collection and robust analytical frameworks, while weaknesses involve potential biases and limited generalizability. Alternative perspectives advocate for technological investments and standardized procedures to improve transportation management, highlighting the need for adaptive solutions tailored to regional challenges. In conclusion, effective transportation management practices significantly influence electoral performance by enhancing transparency, efficiency, and credibility.

Effective logistics and communication are fundamental to the smooth operation of electoral systems worldwide, ensuring the timely dissemination of information, coordination of resources, and management of electoral processes to uphold democratic principles. This study critically examined empirical literature on the relationship between logistics communication and electoral performance, evaluating methodological rigor, theoretical frameworks (Systems Theory), synthesis of findings, critical analysis of methodologies, and alternative perspectives. Evaluating the quality of literature involves assessing methodological rigor, theoretical frameworks, relevance to research questions, and scholarly impact. For example, Molu (2018) uses quantitative methods to assess ICT adoption and operational efficiency in Kenya, while Adekola (2018) employs mixed methods to analyze electoral logistics communication in Nigeria. Khiangte (2018) uses qualitative approaches to study the ECI's communication strategies in India, and James (2021) explores the impact of electronic grey literature on electoral communication through mixed methods. Synthesizing findings reveals common themes and contradictions, such as the positive correlation between ICT adoption and improved electoral logistics found by Molu (2018) and the importance of communication strategies in enhancing electoral credibility noted by Adekola (2018). Khiangte (2018) and James (2021) highlight the benefits of technological innovations and digital platforms in improving voter education and transparency. Systems Theory underscores the interconnectedness of these components, emphasizing that optimal outcomes require harmonious integration. Methodological strengths in these studies include robust data collection and analytical frameworks, while weaknesses involve limitations in generalizability and potential biases from qualitative data. Alternative perspectives advocate for technological investments and standardized procedures to enhance

logistics communication, with studies like Rodríguez *et al.* (2019) and Ehimare *et al.* (2023) emphasizing technological innovations. In conclusion, effective logistics communication management significantly influences electoral performance by enhancing transparency, efficiency, and credibility. Future research should explore diverse electoral contexts and integrate technological advancements to develop universal best practices.

2.6 Research Gaps

The study of logistics management practices within electoral systems is critical for ensuring the efficiency, transparency, and overall credibility of democratic processes worldwide. This essay critically examines existing scholarly literature to identify significant research gaps across various dimensions, including knowledge, evidence, methodological, theoretical, conceptual, geographical, population, and contextual aspects.

Firstly, knowledge gaps in the literature are evident in the limited understanding of unique logistical challenges across diverse geopolitical contexts. While studies like those by Ezeador (2023) and Johnson & Lee (2018) highlight specific challenges in regions like Kenya and broader technological impacts, there remains a lack of comprehensive comparative analyses across different electoral environments. Such analyses could reveal nuanced logistical intricacies influencing electoral outcomes. Empirical evidence linking specific logistics planning practices to electoral performance metrics such as voter turnout and operational efficiency remains sparse. While studies by Smith *et al.* (2017) emphasize the importance of logistics forecasting, rigorous empirical assessments of forecasting models under varying political climates are lacking. This gap hinders the establishment of clear causal relationships between logistics strategies and electoral outcomes.

Methodologically, the literature predominantly relies on qualitative approaches such as case studies and interviews (Davis *et al.*, 2019), limiting the ability to generalize findings across diverse electoral contexts. There is a need for more robust quantitative analyses employing rigorous statistical methods to validate the impact of logistics management practices on electoral performance indicators.

Theoretical frameworks guiding current research often draw from organizational theories like Agency Theory (Johnson & Lee, 2018) but lack integration with emerging perspectives such as resilience theory or complexity theory. These gaps hinder a deeper understanding of how electoral systems adapt to logistical disruptions and complex challenges.

Conceptually, logistics planning in electoral contexts is often narrowly conceptualized around operational efficiency metrics (Richards & Grinsted, 2024), overlooking socio-political influences and stakeholder dynamics. Future research could explore conceptual frameworks that capture the multidimensional nature of logistical challenges and their implications for electoral governance.

Geographically, research on electoral logistics predominantly focuses on specific regions such as sub-Saharan Africa or Southeast Asia, limiting generalizability across diverse electoral systems globally. Addressing geographical and contextual gaps requires comparative studies that encompass a wider range of electoral contexts and logistical challenges.

Population-specific logistics challenges, such as urban versus rural dynamics or barriers faced by marginalized communities in accessing electoral processes, are also underexplored. Understanding these dynamics is crucial for designing inclusive and equitable electoral logistics strategies.

In conclusion, addressing these research gaps requires interdisciplinary collaboration, methodological innovation, and a nuanced understanding of logistical intricacies across diverse electoral environments. By bridging these gaps, future research can contribute significantly to enhancing electoral integrity, operational efficiency, and democratic governance worldwide through informed logistical practices.

2.7 Summary of the Literature review

This chapter presented a comprehensive review of literature examining the role of logistics management practices on the performance of electoral systems in Kenya.

The review was organized around five key thematic areas corresponding to the study variables: logistics planning practices, inventory management practices, transportation management practices, logistics communication practices, and the moderating role of election laws on these relationships.

The theoretical framework underpinning this study drew on five complementary theories. Agency Theory (Jensen & Meckling, 1976) illuminated the principal-agent dynamics governing the delegation of logistics planning duties from election authorities to poll workers, explaining how misaligned incentives and information asymmetry can compromise electoral operations. Resource-Based View Theory (Penrose, 1959; Barney, 2021) demonstrated that the competitive management of internal resources including election materials, warehousing systems, and technology is critical to sustaining the reliability and credibility of electoral processes. Contingency Theory (Woodward, 1958; Burns & Stalker, 1961) established that optimal transportation management strategies are not universal but must be adapted to situational variables including geographical terrain, infrastructure quality, and security conditions. Systems Theory (von Bertalanffy, 1968) provided a holistic lens for understanding how logistics communication functions as an interconnected system in which disruptions in any component whether network coverage, results transmission, or information dissemination cascades into systemic electoral performance deficits. Finally, Institutional Theory (Meyer & Rowan, 1977; Scott, 2014) framed election laws as institutional moderators that structure the regulatory environment within which logistics management practices operate, determining the extent to which those practices translate into credible and consistent electoral outcomes.

The empirical review confirmed that effective logistics planning practices are positively associated with electoral performance, with studies by Njenga and Ngari (2020), Smith et al. (2017), and Davis et al. (2019) collectively demonstrating that early, comprehensive, and coordinated logistical preparation enhances transparency, reduces fraud, and improves voter confidence. Inventory management practices, as evidenced by Akuffo et al. (2019), Kurniawaty et al. (2018), and Rodríguez et al. (2019), were found to significantly influence electoral integrity through rigorous

material auditing, decentralized storage, and technology-assisted tracking systems. Transportation management practices, examined through the studies of James (2024), Ehimare et al. (2023), and Adoki et al. (2023), were shown to directly determine the accessibility, security, and timeliness of electoral material delivery, with adaptive strategies including the use of unconventional transport modes and digital tracking emerging as critical innovations in challenging logistical environments. Logistics communication practices, studied by Molu (2018), Adekola (2018), and Khiangte (2018), were consistently linked to electoral credibility through their role in information dissemination, results transmission, and stakeholder coordination.

The review further identified significant research gaps, including the limited availability of longitudinal quantitative evidence linking specific logistics management variables to electoral system performance metrics in the Kenyan context, and the absence of studies examining all four logistics dimensions concurrently within a unified conceptual framework. These gaps provided the direct justification for the present study, which sought to examine the role of logistics planning, inventory management, transportation management, and logistics communication on the performance of Kenya's electoral system, moderated by election laws, thereby contributing theoretically and empirically to the growing body of electoral logistics study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Research Methodology in context of logistics management practices and performance of electoral systems refers to the systematic approach, procedures, and techniques used by researchers to conduct empirical investigations (Dubey, & Kothari, 2022). In this chapter provided a comprehensive overview of the research methodology employed in this study. It encompassed the research philosophy, research design, target population, sampling frame, sample and sampling technique, research instruments, data collection procedure, pilot test, and data processing and analysis. The chosen methodology facilitated the investigation of research questions through rigorous scientific procedures. (Verma, Verma, & Abhishek, 2024).

3.2 Research Philosophy and Research Design

3.2.1 Research Philosophy

Research philosophy refers to the set of beliefs about the nature of knowledge and how it should be investigated (Verma, Verma, & Abhishek, 2024). It underpins the researcher's approach to collecting, interpreting, and analyzing data. Major research philosophies include positivism, interpretivism, and pragmatism (Dubey, & Kothari, 2022). Positivism emphasizes observable, measurable phenomena and aims for objective knowledge, while interpretivism focuses on understanding subjective experiences and meanings. Pragmatism, on the other hand, prioritizes practical outcomes and seeks to integrate theory and practice to address real-world issues (Sreedharan, & Ambily, 2021). This study examined pragmatism as a suitable research philosophy within the context of studying Logistics Management Practices and Performance of Electoral Systems in Kenya. Pragmatism aligns with the study's objectives by emphasized practical outcomes and integrating theory with practice to address real-world challenges (Dubey, & Kothari, 2022).

Pragmatism, notably advanced by philosophers such as Charles Peirce, (1878); William James, (2020), and John Dewey, (2022) posits that the worth of an idea or theory lies in its practical application and ability to solve real-world problems. In research, pragmatism emphasizes the importance of practical outcomes and actionable insights. It encourages researchers to employ diverse methodologies and theoretical perspectives that best address the research questions and contribute to solving practical issues (Hildebrand, 2022). In electoral systems in Kenya, characterized by complex logistical operations across diverse geographical and political landscapes, pragmatism enables a flexible methodological approach. The study employed a mix of qualitative methods such as interviews and quantitative methods like statistical analysis to comprehensively explore logistical challenges and their impacts on electoral performance (Creswell, 2014). Pragmatism's emphasis on practical solutions is evident in studies like Chege *et al.* (2019), which advocated for ICT innovations to enhance electoral logistics, thereby ensuring efficient material delivery and improving voter confidence (Chege & Ndegwa, 2019). Moreover, pragmatic research values context-specific understanding, acknowledging the unique challenges posed by each electoral cycle influenced by political, social, and geographical factors (Ndegwa, 2017). This approach allows researchers to propose tailored strategies that improve logistical management practices in Kenya's electoral systems. Integrating theoretical frameworks like contingency theory aids in understanding how electoral commissions adapt strategies amidst changing circumstances, thereby enhancing electoral processes (Ruskin, 2020). Nyabola's (2016) integration of systems theory with empirical data further illustrates how pragmatic research bridges theory and practice, offering insights into logistical network dynamics and suggesting practical improvements in electoral logistics management (Nyabola, 2016). Literature supporting pragmatism underscores its methodological flexibility in electoral logistics research, where mixed-method approaches enhance research comprehensiveness and reliability (Smith *et al.*, 2018). For instance, Mutava and Mwangi (2019) highlight mobile technology's role in real-time tracking of election materials, enhancing logistical efficiency and accountability (Mutava & Mwangi, 2019). Contextual understanding remains pivotal in pragmatic studies, with Kamunge *et al.* (2021) emphasizing adaptive strategies tailored to local

conditions and infrastructure challenges, thereby informing effective logistical management practices (Kamunge *et al.*, 2021). In conclusion, pragmatism as a research philosophy offers a robust framework for studying Logistics Management Practices and Performance of Electoral Systems in Kenya, promoting practical solutions grounded in empirical data and theoretical insights, thereby contributing to enhanced electoral integrity and operational efficiency.

3.2.2 Research Design

Research design forms the blueprint for the collection, measurement, and analysis of data, providing a structured approach to answering research questions (Dubey, & Kothari, 2022). It encompasses the strategy, framework, and procedures necessary to conduct a study, ensuring that the research problem is addressed comprehensively. Various research designs exist, including qualitative, quantitative, and mixed-methods approaches, each suited to different types of inquiries and data (Verma, Verma, & Abhishek, 2024). integrates both qualitative and quantitative research methods to leverage the strengths of both paradigms. This approach allows for a more comprehensive understanding of research problems by combining numerical data with detailed contextual insights. Explanatory survey design typically involves collecting, analyzing, and integrating data from both qualitative and quantitative sources in a single study or a series of studies, aiming to provide a more complete picture than could be achieved by either method alone (Sreedharan, & Ambily, 2021).

The study of Logistics Management Practices and Performance of Electoral Systems in Kenya requires a research design that can address both the broad patterns and the nuanced details of logistical operations. Explanatory survey design is particularly suited for this purpose due to its ability to capture comprehensive insights, ensure triangulation, and offer flexibility and adaptability (Hildebrand, 2022). Quantitative data can reveal trends and patterns in logistics performance, while qualitative data can provide deeper insights into the underlying challenges and contextual factors (Sreedharan, & Ambily, 2021). By integrating multiple data sources, mixed-methods research enhances the validity and reliability of the findings. The dynamic nature of

electoral logistics in Kenya necessitates a flexible research approach that can adapt to new information and changing conditions (Thomas, 2021).

Explanatory survey design is characterized by its integration of qualitative and quantitative approaches (Sreedharan, & Ambily, 2021). It can be implemented in various ways, including convergent parallel design, explanatory sequential design, and exploratory sequential design. Convergent parallel design involves collecting qualitative and quantitative data simultaneously, analyzing them separately, and then merging the results (Aityan, 2022). Explanatory sequential design starts with quantitative data collection and analysis, followed by qualitative data to explain or build on the initial findings. Exploratory sequential design begins with qualitative data to explore a phenomenon, followed by quantitative data to test or generalize the qualitative findings. Each of these designs offers distinct advantages depending on the research objectives and context.

In studying logistics management practices in Kenya's electoral systems, mixed-methods research allows for a thorough examination of both logistical performance metrics and the contextual challenges faced by electoral officials. For example, quantitative methods can be used to analyze data on the timeliness and efficiency of material distribution, while qualitative methods can explore the experiences of electoral staff in managing logistical operations (Hildebrand, 2022). Triangulation in mixed-methods research involves using multiple data sources to cross-verify findings, thereby enhancing their credibility. For instance, survey data from electoral officials can be triangulated with interview data from logistics managers and focus groups with voters to provide a well-rounded understanding of logistical issues and their impact on electoral performance (Thomas, 2021).

The flexibility of explanatory survey design is particularly valuable in the context of Kenya's electoral logistics, which are influenced by various factors such as geographical diversity, infrastructure variability, and political dynamics. This approach allows researchers to adapt their methods as new insights emerge, ensuring a comprehensive analysis of the logistical challenges and their solutions (Changder, 2022). Explanatory survey design enables a deep contextual understanding of the

unique challenges in Kenya's electoral systems. Qualitative data from interviews and focus groups can reveal the specific logistical hurdles encountered in different regions, such as transportation difficulties in remote areas or security concerns in politically volatile regions. This contextual knowledge is crucial for developing targeted strategies to improve logistical management (De Waal, 2021).

By integrating quantitative performance data with qualitative insights, mixed-methods research can generate practical, evidence-based recommendations for improving logistics management in Kenya's electoral systems. For instance, findings from quantitative analyses on logistical delays can be complemented by qualitative insights into the causes of these delays, leading to actionable strategies to enhance efficiency and transparency. Creswell and Plano Clark (2018) argue that mixed-methods research provides a more comprehensive approach to studying complex issues by combining the strengths of both qualitative and quantitative methods (Thomas, 2021). This approach is particularly relevant for electoral logistics, where both performance metrics and contextual factors need to be understood.

Verma, Verma, & Abhishek, (2024). emphasizes the importance of triangulation in mixed-methods research for enhancing the validity and reliability of findings. In electoral logistics, triangulating data from multiple sources, such as surveys, interviews, and focus groups, can provide a robust understanding of logistical practices and their impact on electoral performance. Teddlie and Tashakkori (2009) highlight the flexibility and adaptability of explanatory survey design, making it suitable for dynamic and evolving research contexts like electoral logistics. This flexibility allows researchers to adjust their methods in response to new insights and changing conditions. Yin (2014) underscores the value of qualitative methods in capturing contextual factors and providing in-depth understanding, which can be complemented by quantitative analysis in a explanatory survey design. This approach is crucial for understanding the unique logistical challenges in Kenya's electoral systems. Johnson, Onwuegbuzie, and Turner (2007) discuss how mixed-methods research facilitates the development of practical solutions by integrating empirical data with contextual insights. In the context of electoral logistics, this

approach can lead to actionable recommendations that improve efficiency, transparency, and credibility.

3.3 Target Population

Target population is defined as “the population about which information is wanted” or the “totality of elements which are under discussion and about which information is desired”. Often, the word “population” (Ratten,2023). The word “target” emphasizes, however, that this population is not necessarily the same as the one that we end up sampling (Singh, 2022). According to Berg (2001), the target population refers to the larger population to which the study ultimately would like to generalize the results. The research population in this study was 373 Commission Secretary/Chief Executive Officer (CS/CEO), Deputy Commission Secretary (DCS), Directors, Managers, County Election Managers, Constituency Election Coordinators. Thomas, (2021) posit that units of analysis are units that are designed for purposes of aggregating their characteristics in order to describe some larger group or abstract phenomenon. Dubey, & Kothari, (2022). describe the units of analysis as the most elementary part of the phenomenon to be studied. In this study, the unit of analysis was the different categories discussed in this paper as election officials within 290 constituencies in 47 counties of Kenya August 2022 election. The unit of observation in this study was 383 Commission Secretary/Chief Executive Officer (CS/CEO), Deputy Commission Secretary (DCS), Directors, Managers, County Election Managers, Constituency Election Coordinators.

3.4 Sampling Frame

Sampling frame is the set of source materials from which the sample is selected (Thomas, 2021). The study needed sampling frame because of the fact provided that sampling frame provides a means for choosing the particular members of the target population that are to be interviewed in the survey (Ratten,2023). This was the guiding principle of the study to the current research. Verma, Verma, & Abhishek, (2024) justifies this fact by stating that, sampling frame is a list of all items where a representative sample is drawn for the purpose of research. The sampling frame had all the 373 Commission Secretary/Chief Executive Officer (CS/CEO), Deputy

Commission Secretary (DCS), Directors, Managers, County Election Managers, Constituency Election Coordinators within 290 constituencies in 47 counties of Kenya according to August 2022 election.

3.5 Sample Size and Sampling Technique

A sample is a portion or part of the population of interest (Verma, Verma, & Abhishek, 2024). The purpose of sampling is to gain an understanding about some features or attributes of the whole population based on the characteristics of the sample. The study used stratified random sampling where the subjects are selected in such a way that the existing subgroups in the population are more or less reproduced in the sample (Parsons, 2020). Using the sampling frame, it was established that there were 373 Commission Secretary/Chief Executive Officer (CS/CEO), Deputy Commission Secretary (DCS), Directors, Managers, County Election Managers, Constituency Election Coordinators within 290 constituencies in 47 counties of Kenya according to August 2022 election. A sample in this study refers to the respondents from which information was obtained (Singh,2022). This study defines sampling as the process of selecting these groups. Stratified random sampling technique guarantees that each stratum was represented in the sample and was more accurate in reflecting the characteristics of the population. Parsons, (2020) posited that a population is stratified based on different features of the population and a random sample is picked from each stratum. In this sampling method, sampling error is considerably reduced. The sample size of the study was determined using a formula provided in Dubey, & Kothari, (2022).

Using Kothari's formula for a finite population:

$$n = \frac{Z^2 pq N}{e^2 (N - 1) + Z^2 pq}$$

n=sample size without considering the finite population

Z = normal reduced variable at 0.05 level of significance which is 1.96

P = population reliability; where p is 0.5 which is taken for all population

$$q = (1-p) = 0.5$$

e = margin of error considered which is 10% for this study.

e = margin of error considered which is 5% for this study;

N = target population, which is 373.

Substituting into the formula,

$$\text{the numerator} = Z^2 pqN = (1.96)^2 \times 0.5 \times 0.5 \times 373 = 0.9604 \times 373 = 358.2292,$$

$$\text{while the denominator } e^2(N - 1) + Z^2 pq = (0.05)^2 \times 372 + 0.9604 = 0.93 + 0.9604 = 1.8904.$$

$$\text{Therefore, } n = 358.2292 \div 1.8904 = 189.5 \approx 190 \text{ respondents}$$

3.6 Data Collection Instruments

The study used primary and secondary data. Primary data was collected directly from the respondents using online questionnaires. Secondary data was used to acquire information on the national election's outcomes (Changder, 2022). This information was obtained from previous evaluation reports carried out by the Independent Electoral and Boundaries Commission. The data collection instruments that were used in this study were self-administered structured questionnaire and an interview guide (Verma, Verma, & Abhishek, 2024). A research instrument in this study was a device that the study used to collect data. Self-administered structured questionnaire was used to collect quantitative strands while the interview guide was used to collect qualitative strands of the research. The current study involved both the qualitative and quantitative aspects of performance and therefore, self-administered structured questionnaire and interview guide were appropriate for this study (Nayak, & Singh, 2021).

Verma, Verma, & Abhishek, (2024) posit that a self-administered questionnaire (SAQ) refers to a questionnaire that has been designed specifically to be completed by a respondent without intervention of the researcher collecting the data, self-administered questionnaire is usually a stand-alone questionnaire. A self-

administered structured questionnaire is used to collect quantitative data from respondents. As indicated by Nayak, and Singh, (2021), the use of this instrument assumed that the respondents understood the significance of the research and could understand the items in the instrument. The questionnaire took the format of five-point Likert scale of 1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree as recommended by Alan, (2001). In his interpretation in analysis of data, Carifio and Rocco (2007) indicated that; Strongly Disagree $1 < SD < 1.8$; Disagree $1.8 < D < 2.6$; Neutral $2.6 < N < 3.4$; Agree $3.4 < A < 4.2$; and Strongly Agree $4.2 < SA < 5.0$. The study therefore followed this criterion while analyzing data in this study.

The study examined data on national election results from August 2007 to August 2022. This information was gathered from the Independent Electoral and Boundaries Commission using an open-ended interview guide. This ensures that the information acquired is as accurate as possible regarding Kenya's national election results from 2007 to August 2017. Interviews were performed to acquire thorough information regarding the national performance between 2007 and August 2022. This was consistent with the quantitative data acquired through surveys, as well as the research design and paradigm that drove the study's conclusions about the relationships under investigation.

In addition to the self-administered structured questionnaire and the interview guide, the study employed documentary analysis as a third data collection method, and it is this method that generated the secondary evidence presented alongside the survey findings in Chapter Four. The documents were selected purposively using three criteria: the document had to be an official publication of the IEBC, the Judiciary or a recognized election observation body; it had to fall within the 2013 to 2027 electoral period covered by the study; and it had to bear directly on at least one of the study variables. Applying these criteria yielded a corpus comprising the IEBC annual reports for the financial years 2013/14 to 2023/24, the post-election evaluation reports for the 2013, 2017 and 2022 General Elections, the Election Operation Plans including the EOP 2025–2027, and the Supreme Court presidential election petition judgments of 2013, 2017 and 2022.

The documents were coded in MAXQDA using a deductive coding framework whose a priori codes were derived from the operationalization of the study variables in Table 3.2, namely logistics planning practices, inventory management practices, transportation management practices, logistics communication and election laws, together with the performance indicators of reliability, consistency and credibility, with provision for emergent sub-codes where the material warranted them. The reliability of the documentary analysis was safeguarded in three ways. First, a code–recode procedure was applied, in which a sample of the documents was recoded after an interval of two weeks and the two rounds of coding compared for consistency. Second, an audit trail linking every extracted finding to its source document was maintained throughout the analysis. Third, the documentary findings were triangulated against the questionnaire and interview data, and discrepancies between the sources were interrogated rather than suppressed.

3.7 Data Collection Procedures

In the journal of mixed methods research, the type of data collected was guided by the objectives of the study. In this study therefore, primary data was gathered from the sample (Changder, 2022). Using the sampling frame, it was established that there were 373 Commission Secretary/Chief Executive Officer (CS/CEO), Deputy Commission Secretary (DCS), Directors, Managers, County Election Managers, Constituency Election Coordinators within 290 constituencies in 47 counties of Kenya. while secondary data was obtained from the reports, and Court cases relating to Kenya 2007 to 2022 election outcomes. As indicated by Dubey and Kothari, (2022) from Parsons, (2020), both primary and secondary sources of data are permitted in research. This study will appreciate both primary and secondary sources of data but the main focus of this study will be data obtained from primary sources through a self-administered structured questionnaire and an interview guide. Using the view of Dubey and Kothari, (2022), the data collection methods will be informed by the study objectives. The study used this method to ensure that every detail is captured to help make sound judgement and hence advice appropriately. A follow up time schedule was agreed upon by the researcher to guide on the supervision of the research progress. In addition, the research assistants will be given copies of the

cover letter, the letter from the university, and the letter from NACOSTI to permit them collect data on behalf of the researcher.

3.8 Pilot Study

Parsons, (2020), posit that pilot test was used to establish the accuracy and appropriateness of the research design and instrumentation. This was informed by the fact that the results of the current research should remain reliable and valid as much as possible. The study used 10% of sample size to carry out the pilot study of which these was part of the of the accessible population (Aityan, 2022). The respondents who participated in the pilot testing of the research instruments was exempted from being respondents in the main study to eliminate biasness in the research results based on prior knowledge of the contents in the research instrument. The study used exponential non-discriminative snowball sampling techniques in the selection of the respondents in pilot testing, which according to Thomas, (2021), ensures that the first subject is recruited and then he/she provides multiple referrals. Each new referral then provides with more data for referral and so on, until there is enough number of subjects for the sample. To check the validity of the research instruments, the study sought an expert opinion through a focus group discussion.

3.8.1 Reliability of Research Instruments

Reliability of research instruments is defined by Dubey, and Kothari, (2022), as the consistency of scores obtained and has two aspects; stability and equivalence. Verma, Verma, and Abhishek, (2024), on the other hand, defines reliability as the degree to which a measurement technique can be relied on to make sure consistent results upon repeated application. This is justified by Thomas, (2021), who indicates that a research design, in fact, has a great bearing on the reliability of the results arrived at and as such constitutes the firm foundation of the entire edifice of the research work. Adjectives like flexible, appropriate, efficient, and economical often characterize a good design. The design, which minimizes bias and maximizes the reliability of the collected and analyzed data, is generally considered a good design. In current research, the study was informed by these qualities, and that was the basis for testing the reliability of this study (Thomas, 2021).

Furthermore, Thomas, (2021) indicates that if it provides consistent results, a measuring instrument is reliable. Dubey, and Kothari, (2022), indicated that researchers use many methods to obtain reliability of research tools and that the current study used the test-retest method as a result. Thomas, (2021), argue that this approach involves administering the same test twice to the same group after a certain period of time since the previous test, which was applicable to the current study in the view of the study, has elapsed. The coefficient of reliability of the research instrument was assessed using the Alpha coefficient of Cronbach. In order to form a single scale, this instrument measures internal consistency among a group of items combined. According to Verma, Verma, and Abhishek, (2024), a coefficient of Cronbach-alpha greater than 0.70 indicates a reliable factor. If there is a Cronbach alpha coefficient of less than 0.7, Before the main research is carried out to the appropriate level, the instrument should then be revised. The following is the commonly accepted rule of thumb for describing the internal consistency of a research instrument, according to George and Mallery (2003).

Table 3.1: Cronbach's Alpha

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Source: George and Mallery, (2003)

3.8.2 Validity of Research Instruments

The validity of a research instrument is, according to Donald and Delno (2006), the appropriateness, meaningfulness and usefulness of the research instrument in relation to the inferences made by a study. Furthermore, Verma, Verma, and Abhishek, (2024), indicate that three kinds of validity are of interest to researchers, including: content-related, criterion-related, and construction. Validity related to the content is the content and format of the instrument; validity related to the criterion is the relationship between the scores obtained using an instrument and the scores obtained

using one or more instruments or measures; and validity of the construct is the nature of the measured psychological construct or characteristic (Changder, 2022). The validity of the research tools was tested through the content-related method in the current study. This validity method test was informed by the fact that it was consistent with the study goals and the paradigm of the research.

3.8.3 Pilot Study Results

3.8.3.1 Pilot Study Response rate

Sreedharan, and Ambily, (2021) stated that pilot test is used to establish the accuracy and appropriateness of the research design and instrumentation. This was informed by the fact that the results of the current research should remain reliable and valid as much as possible. The study used 1 County Election Managers and Constituency Election Coordinators. to carry out the pilot study of which these were part of the sampled population. This represented 3% of the accessible population. This is generally supported by social scholars such as Mugenda and Mugenda (2003) who indicate that successful pilot study uses 1% to 10% of the actual sample size. The respondents who participated in the pilot testing of the research instruments were exempted from being respondents in the main study to eliminate biasness in the research results based on prior knowledge of the contents in the research instrument.

3.8.3.2 Reliability of Research Instruments

Dillman *et al.*, (2014) stated that reliability of a measure indicates the extent to which it is without bias (error free) thus ensuring consistent measurement across time and the various items in the instrument. Reliability of the instrument was carried out using Cronbach's alpha constant (co-efficient) which is a measure of internal consistency and average correlation. It ranges between 0 and 1. As a rule of thumb acceptable alpha should be at least 0.70, (Mugenda & Mugenda, 2003). Higher alpha coefficient values mean there is consistency among items in measuring the concept of interest. As shown in Table 3.2, the raw Cronbach's alpha coefficients ranged from 0.687 (inventory management) to 0.895 (performance of electoral systems). The inventory management scale's standardized-item alpha of 0.701 met

the 0.70 threshold, and all other scales exceeded it comfortably; the instrument was therefore adjudged sufficiently reliable for the main study

Table 3.2: Summary of Cronbach Alpha for Reliability Assessment

Variables	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items	Remarks
Logistics Planning	.784	.802	10	Accepted
Inventory Management	.687	.701	10	Accepted
Transportation Management	.876	.888	10	Accepted
Logistic Communication	.876	.891	10	Accepted
Electoral Laws	.847	.873	8	Accepted
Performance of Electoral System	.895	.874	7	Accepted

3.8.3.3 Validity Results

The constructs' validity was tested using factor analysis. Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity are two regularly used tests of sample adequacy. In this study, these two tests were employed to determine the significance of the association between the independent factors and the dependent variable. Kaiser-Meyer-Olkin and Bartlett's tests are employed in most social science studies to determine sample adequacy, which is why these two tests were used.

A Kaiser-Meyer-Olkin acceptable value for a factor to be significant ranges from 0 to 1, and an index greater than 0.5 is considered excellent. The Bartlett's Test of Sphericity is concerned with the study's relevance in terms of the validity and applicability of the elements for a specific investigation. The acceptable index for the Bartlett's Test of Sphericity must be less than 0.05.

The findings of the Kaiser-Meyer-Olkin sample adequacy test and the Bartlett's Sphericity test on the validity and applicability of the variables. Table 3.3 presents the results of the sampling adequacy test. The KMO measures of sampling adequacy produced a value of 0.685 while Bartlett's test of sphericity had a consistent significance of $p < .001$ which suggest and confirmed sampling adequacy. Bartlett's test of sphericity had a chi-square value of 190.469 p-value of 0.000.

The results from the Kaiser-Meyer Olkin of sampling adequacy value is higher than the cut-off value of 0.8 and approaches 1.0 indicating that the sampling number collected is adequate (Shields & Rangarjan (2013). This result is further confirmed by the Bartlett's Test of Sphericity which re-affirms the adequacy of the data collected ($0.000 < p < 0.05$)

Table 3.3: Summary of Validity Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.685
Bartlett's Test of Sphericity	Approx. Chi-Square	190.469
	Df	15
	Sig.	.000

Additionally, content validity was established through the administration of the instrument to a panel of six experts in the field of Logistics Management. These experts were asked to evaluate the relevance of each item in the instrument and provide their comments accordingly. Islam, Khan, & Baikady, (2022), posits that content validity can be ensured through two primary standards: item sampling and item construction method. According to Sürücü, and Maslakçı, (2020), content validity can be established by utilizing various methods such as reviewing relevant literature, consulting representatives from the target population, and obtaining ratings from experts in the field. The present study employed the expert rating method in order to assess the content validity of the instrument. Nevertheless, as stated by Parsons, (2020), it is recommended that the number of expert raters for content domains of a scale should range from five to ten. In the present study, this guideline was adhered to. According to Yaghmale (2009), it is commonly accepted among scale developers to use a criterion of 0.80 as the minimum threshold for item acceptability in an instrument. In a similar vein, Changder, (2022) recommends that when dealing with novel instruments, researchers should strive to achieve a factor rating value of at least .80 (80%) as assessed by expert raters. In the present study, the evaluation of each factor item was conducted based on criteria such as relevance, clarity, simplicity, and absence of ambiguity, utilizing a four-point rating scale. The formula employed in this study to compute the content validity index (CVI) was as follows:

$$CVI=K/N$$

Where, K is the total number of items in the questionnaire declared valid by both raters/ supervisors while N represents the total number of items in the questionnaire. From this formula, the validity of the items in the instrument was calculated as per the results of the expert raters. The results of the raters are summarized in Table 3.4. Table 3.4 contains the total items considered valid by the raters and their corresponding values

Table 3.4: Content Validity Test Results

Raters	Total Items	Valid Items	Fraction
1 st Rater	50	47	0.94
2 nd Rater	50	48	0.96
3 rd Rater	50	46	0.92
4 th Rater	50	45	0.90
5 th Rater	50	46	0.92
6 th Rater	50	46	0.92

The computed content validity indexes were compared with the standard content validity index of 0.80 for validity. From Table 4.5 it is evident that all the six (6) expert raters had ratings above 0.80 and therefore these ratings show the instrument to be unidimensional, consistent, reliable and valid (Amin, 2005). These rating meant that the items could be used in collecting the desired information for the study.

3.9 Data Analysis and Presentation

3.9.1 Data Analysis

In this study, the guiding principle for data analysis was based on whether the information is qualitative or quantitative. Verma, Verma, and Abhishek, (2024), indicate that data analysis examined what has been gathered in a study or experiment and makes decisions and conclusions. Data analysis techniques for mixed methods was used in this study, integrating both descriptive and inferential data analysis. correlation coefficient (r) and regression analysis of the product moment of Pearson will be used. Verma, Verma, and Abhishek, (2024), suggests that the product moment

correlation (r) of Pearson is a measure of the linear dependence (correlation) between two variables and can give their relationship a positive or negative value.

In this research, pearson's product moment correlation coefficient (r) was also used to analyze the linear role of both the dependent variable 's main predictor variables. As a measure of the strength of linear dependence between two variables, Correlation Coefficient (r) is widely used in social sciences (Singh, 2022). Pearson's Product Moment Correlation (r) was used for data analysis since the role of the primary predictor variables on the dependent variable was linear. The decision pointed the following in the interpretation of the results for the linear relationships in the study: for a weak correlation, "r" will range from + 0.10 to + 0.29; for a moderate correlation, "r" ranged from + 0.30 to + 0.49; for a strong correlation, "r" ranged from + 0.5 to + 1.0 (Changder, 2022). Since the hypothesis was involved in this research, testing of coefficients of regression was used. Regression analysis was performed to determine if each of the four independent variables has a significant relationship with the national election performance.

In the current study, the response (criterion) variable (Y) is performance of electoral systems in Kenya while the independent (predictor) variables are Logistics planning practices (LPP), Inventory management practices (IMP), Transportation management (TM), and Logistics communication (LC). The following model was used in the study;

$$BP = \beta_0 + \beta_1 LPP + \beta_2 IMP + \beta_3 TM + \beta_4 LC + \epsilon \dots \dots \dots \text{Model 1}$$

ϵ = The error variability (error term). Assumed to be normally distributed with mean zero and constant variance.

β_1 , β_2 , β_3 , and β_4 , are model parameters and they describe the directions and strengths of the role of independent on the dependent variables. β_0 - a constant (intercept).

The significant proportion of statistical tests are based on several assumptions about the variables included in the study. The results may not be valid if these assumptions

are not met, resulting in either Type I or Type II errors, or over- or under-estimation of the significance or size(s) of the effect (Verma, Verma, & Abhishek, 2024), Ratten, (2023), noted that knowledge and understanding of the circumstances are essential for meaningful data analysis when violations of assumptions lead to serious biases and when they are of little consequence. However, as Nayak & Singh, (2021) noted, couple papers report that they may have tested the assumptions of the statistical tests about which they rely to draw their conclusions, questioning the validity of their results.

This study will test the assumptions of the statistical tests in a satisfactory way. Normality, heteroscedasticity, homoscedasticity, linearity, and multicollinearity was tested in this research. Normality is important in understanding the distribution 's shape and helps to predict scores for dependent variables (Nayak & Singh, 2021). Heteroscedasticity means a situation in which the variance of the dependent variable varies across the data, as opposed to a situation in which Ordinary Least Squares, OLS, assumes that $V(\epsilon^j) = \sigma^2$ is constant (homoscedasticity) for all j , meaning that the variance of the error term is constant. Heteroscedasticity will complicate analysis because many methods are based on an assumption of equal variance in regression analysis (Dubey, & Kothari, 2022). This study used SPSS software to test the normality, and heteroscedasticity, of regression residuals. SPSS software was used to test for assumptions on variables used in their analyses (Singh, 2022). The used SPSS software to test for assumptions on variables used in their analyses in their study on Push and Pull Effects of Homeland Information Security Incentives (Smith, 2022).

3.9.1.1 Hierarchical Regression for Testing Moderation Effect

In line with the recommendations of Sreedharan, & Ambily, (2021). a hierarchical multi-regression analysis was used to test the effects. In addition, this same four sub-hypotheses of the fifth hypothesis sought to establish the role of Election laws factors in Logistics management practices and performance of electoral systems in Kenya. That is, the moderating effect of the role of Election Laws on logistic management practices and the general election performance in Kenya

Hypotheses was tested using a moderate regression analysis to examine the extent to which the moderator variable affects the relationship between specific Logistics management practices and performance of electoral systems in Kenya. The moderator effect was examined using regression analysis procedures as outlined in Verma, Verma, and Abhishek, (2024). The moderating effect of the role of election laws on logistic management practices and performance of electoral systems in Kenya.

$$\text{MMR Model: } Y = \beta_0 + \beta_1 X_1 M + \beta_2 X_2 M + \beta_3 X_3 M + \beta_4 X_4 M + \epsilon \dots \dots \dots \text{Model 2}$$

Where: -

Y is dependent variable (General election performance)

X₁ is independent variable # 1 (Logistics planning practices)

X₂ is independent variable # 2 (Inventory management practices)

X₃ is independent variable # 3 (Transportation management)

X₄ is independent variable # 4 (Logistics communication)

M is mediating variable (Election laws)

X₁.M is interaction term of Logistics planning practices and performance of electoral systems in Kenya

X₂.M is interaction term of Inventory management practices and performance of electoral systems in Kenya

X₃.M is interaction term of Transportation management and performance of electoral systems in Kenya

X₄.M is interaction term of Logistics communication and performance of electoral systems in Kenya

β₀ is a constant

ε is Error term (unexplained variation due to other unmeasured factors).

3.9.2 Data Presentation

Data was presented using statistical techniques, graphic techniques or a combination of both in order to produce comprehensive conclusions (De Waal, 2021). Using

statistical techniques such as tables, quantitative data was presented, while qualitative data was descriptively presented in this study.

3.9.3 Measurement of Variables

The dependent variable is the performance of the national general election, which was evaluated by four independent variables: Logistics Planning Practices (LPP), Inventory Management Practices (IMP), Transportation management and Logistics communication, Voter turnout, Consistency and Credibility measurement of independent variables and dependent variable variables were measured by the performance of electoral systems in Kenya as shown in Table 3.2.

Table 3.2: Measurement of Variables

Variable	Constructs	Operational Definition	Measurement Scale
Logistics planning practices	i.Logistics process mapping ii.Logistics Forecasting iii.Contingency Plan Implementation	Responses to be provided in Likert Scale of 1-5 to examine the role of Logistics planning practices on performance of electoral systems in Kenya	Ordinal scale (non-dichotomous type)
Inventory management practices	i.Voting Material handling ii.Inventory control iii.Packaging Materials for Delivery	Responses to be provided in Likert Scale of 1-5 to determine the relationship between inventory management practices and performance of electoral systems in Kenya	Ordinal scale (non-dichotomous type)
Transportation management	i.Delivery voting material on site ii.Transportation security iii.Reverse logistics	Responses to be provided in Likert Scale of 1-5 to assess the role of Transportation management on performance of electoral systems in Kenya	Ordinal scale (non-dichotomous type)
Logistics Communication	i.Communication Response Time ii.Communication Channels Utilized iii.Information Dissemination	Responses to be provided in Likert Scale of 1-5 to examine the role of Logistics Communication on performance of electoral systems in Kenya	Ordinal scale (non-dichotomous type)
Performance election system	i.Reliability ii.Consistency iii.Credibility	Responses to be provided in Likert Scale of 1-5 to determine the role of Logistics management practices on performance of electoral systems in Kenya	Ordinal scale (non-dichotomous type)
Election laws	i.Conformance ii.Compliance	Responses to be provided in Likert Scale of 1-5 to determine the role of Logistics management practices on performance of electoral systems in Kenya	Ordinal scale (non-dichotomous type)

3.9.4 Hypotheses Testing

For empirical conclusions to be arrived at, tests of various hypotheses were conducted. Table 3.3 indicates the summary of the research hypotheses, type of analysis, decision rule, and the interpretation of the results.

Table 3.3: Statistical Tests of Hypotheses

Hypothesis statement	Type of Analysis	Decision rule and interpretation
H01: Logistics planning practices has no statistically significant relationship on performance of electoral systems in Kenya	Pearson's Correlation	Reject H_{01} if P-value is < 0.05 Fail to reject H_{01} if P-value is > 0.05 $Y = \beta_0 + \beta_1 X_1 + \varepsilon$
H02: Inventory management practices have no statistically significant relationship on performance of electoral systems in Kenya	Pearson's Correlation	Reject H_{02} if P-value is < 0.05 Fail to reject H_{02} if P-value is > 0.05 $Y = \beta_0 + \beta_2 X_2 + \varepsilon$
H03: Transportation management has no statistically significant relationship on performance of electoral systems in Kenya	Pearson's Correlation	Reject H_{03} if P-value is < 0.05 Fail to reject H_{03} if P-value is > 0.05 $Y = \beta_0 + \beta_3 X_3 + \varepsilon$
H04: Logistics communication has no statistically significant relationship on performance of electoral systems in Kenya	Pearson's Correlation	Reject H_{04} if P-value is < 0.05 Fail to reject H_{04} if P-value is > 0.05 $Y = \beta_0 + \beta_4 X_4 + \varepsilon$
H05: Election laws have no statistically significant moderating relationship between logistics management practices and the performance of electoral systems in Kenya.	Pearson's Correlation	Reject H_{05} if P-value is < 0.05 Fail to reject H_{05} if P-value is > 0.05 $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_{5\alpha} X_1 * M$

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter begins with description of the study findings and discussion of results of the study on the role of logistics management practices on the performance of electoral systems in Kenya. The data for the study was collected from 121 employees working with IEBC. Data was presented in the form of frequency distribution tables to facilitate description and explanation of the study findings. The variable of the study was logistics planning, inventory management practices, transportation management and logistics communication.

4.2 Response Rate

The sample size for the study was 190 respondents, as determined in Section 3.5, of whom 19 were utilized for the pilot testing of the instruments and were consequently excluded from the main survey. In total, 171 questionnaires were distributed to the County Election Managers and Constituency Election Coordinators within 290 constituencies in 47 counties of Kenya according to the August 2022 election, while the senior officers of the Commission were engaged through the interview guide described in Section 3.6. A total of 110 questionnaires were reasonably and adequately completed, representing a 64.3% response rate, while 61 questionnaires were not returned, accounting for 35.7% of the total distributed. Sekaran and Bougie (2016) recommend 75 percent as an ideal benchmark for survey responses; although the rate attained in this study falls below that ideal, it is well within the thresholds regarded as adequate in the wider methodological literature. According to Kothari (2007), a response rate of 50% is acceptable to analyse and publish, 60% is good, 70% is very good, and beyond 80% is an excellent response rate. The 64.3% response rate attained in this study therefore falls within the good category as per Kothari's (2007) classification. Saunders et al. (2003) on the other hand indicate that 30 to 50 percent response rate is reasonable enough for statistical generalizations,

further affirming the adequacy of the response rate achieved. Babbie and Benaquisto (2009) stated that a response rate of 50% is adequate, while Bailey (1987) set an adequate response rate at 75%. Mugenda (2008) avers that a response rate of 50% is adequate, 60% and above is good, and above 70% is very good — placing the current study's 64.3% response rate within the good range. Furthermore, the JKUAT university introductory letter and NACOSTI research permit were delivered before the actual data collection was conducted, which may have alerted respondents in advance and contributed positively to the response rate realized.

Table 4.1: Response Rate

Response	Respondents	Percentage
Returned	110	64.3%
Not Returned	61	35.7%
Total Distributed	171	100%

4.3 Demographic Information

This highlights the demographic information of the respondents that includes gender, age education level and job tenure. The findings are presented in Table 4.9. The study sought to assess the demographic information of the respondents. Demographic information aides in the laying of social, economic foundations that might influence the direction of the investigation.

4.3.1 Gender

In this part, the research sought to find out the gender of the respondent with an intention of confirming whether it had an impact on electoral management in Kenya. This was important for the study as it establishes the level of representation by gender. The responses were tabulated as shown in Table 4.2. Which indicates that the majority (60%) were male while 40% were female. This means that Independent Electoral and Boundaries Commission is male dominated because of hard nature of work. Also, the finding implies that Kenyan electorate had adhered to gender rule as stipulated in the United Nations representation guidelines. This gender distribution was expected to accommodate the opinions and views from both sides of the gender divide. This study was dominated by the female which is in line with (UNDP, 2014)

who asserted that the most electoral process in developing world is female controlled where male participants in development activities is traditionally looked down upon.

Table 4.2: Gender Demographic Information

Gender	Frequency	Percent	Cumulative Percent
Male	66	60.0	60.0
Female	44	40.0	100.0
Total	110	100.0	

4.3.2 Age of Respondents

The study sought to determine the distribution of age among the study respondents. The majority of respondents fall within the 30–39-year age group, constituting 58.2% of the total respondents. This indicates a significant representation of relatively younger professionals in managerial and coordination roles within the electoral system. The next largest group is those aged 20–29 years, accounting for 20.9% of the respondents, suggesting that there is a considerable number of even younger individuals involved in electoral management. The 40–49-year age group comprises 10.9% of the respondents, while those above 50 years represent 10.0%. The cumulative percentages show that 79.1% of the respondents are below 40 years, indicating a youthful demographic in these critical roles. The age distribution of electoral officials can significantly impact the management and efficiency of election processes. Younger individuals often bring fresh perspectives, technological proficiency, and innovative approaches to logistical challenges (Bartlett & Miller, 2011). Studies have shown that younger professionals in managerial roles can drive modernization and efficiency improvements in various sectors, including public administration (Schmidt, 2015). The high percentage of younger electoral managers and coordinators aligns with global trends emphasizing the inclusion of youth in governance and public administration. Youth participation is crucial for democratic development and ensures that electoral processes evolve with contemporary societal changes (Sloam, 2016). Younger electoral officials are more likely to embrace and implement technological advancements that can streamline electoral processes, enhance transparency, and improve voter engagement (Bennett & Segerberg, 2012). While younger professionals bring innovation, the presence of older respondents

(those aged 40 and above) is equally important. These individuals often possess extensive experience and institutional knowledge critical for maintaining continuity and stability in electoral processes (Dalton, 2008). The mix of ages within the electoral management workforce can therefore create a balanced environment where innovation is tempered by experience and wisdom. However, the age distribution also presents certain challenges. Younger managers might lack the extensive experience needed for certain complex electoral situations, potentially requiring mentorship and support from older, more experienced colleagues (Choudhury & McConnell, 2013). Conversely, older officials might face challenges in adapting to new technologies and innovative practices, necessitating continuous training and professional development (Van Deursen & Van Dijk, 2014). In case Policymakers wanted policies should focus on creating frameworks that facilitate intergenerational collaboration within electoral management. Programs that encourage knowledge transfer between older and younger employees can enhance overall efficiency and innovation (Bal, Reiss, Rudolph, & Baltes, 2011). Additionally, investment in Logistics training and development programs tailored to the needs of different age groups can ensure that all electoral managers and coordinators are well-equipped to handle their responsibilities effectively (Kuijpers, Schyns, & Scheerens, 2006).

Table 4.3: Age of Respondents

Age of Respondents	Frequency	Percent	Cumulative Percent
20-29 years	23	20.9	20.9
30-39 years	64	58.2	79.1
40-49 years	12	10.9	90.0
above 50 years	11	10.0	100.0
Total	110	100.0	

4.3.3 Level of Education

Education has become a critical aspect of human life. The table presented the educational levels of County Election Managers and Constituency Election Coordinators within 290 constituencies in 47 counties of Kenya. Among the respondents, 50% held a Bachelor's degree, representing the majority, followed by 23.64% with a Diploma. Those with a Master's degree accounted for 18.18%, while 4.54% had a Certificate, and 3.64% possessed a PhD. The cumulative percentages

showed that 71.82% of respondents had at least a Bachelor's degree, highlighting a highly educated workforce within the electoral management system.

The high percentage of respondents with a Bachelor's degree or higher indicated a well-educated group of election managers and coordinators, which was crucial for the efficient and effective management of electoral processes. According to Sandholtz and Taagepera (2005), higher educational attainment among election officials was linked to better organizational skills and a greater capacity to handle complex electoral logistics and administrative tasks. The presence of individuals with advanced degrees (PhD and Master's) further enhanced the analytical and strategic capabilities within the electoral system, supporting a more sophisticated approach to election management (Norris, 2014).

Education played a critical role in the competence and performance of electoral officials. Studies suggested that higher educational levels contributed to better decision-making, problem-solving, and leadership skills (Bennett, 2012). This was particularly relevant in the context of electoral management, where officials had to navigate intricate legal frameworks, logistical challenges, and dynamic political environments. The significant proportion of respondents with a Diploma or Certificate (28.18%) also underscored the importance of practical skills and vocational training in complementing academic qualifications, providing a balanced skill set necessary for effective electoral management (Behrens, 2003).

However, the distribution also pointed to potential areas for improvement. While the majority had a Bachelor's degree or higher, the relatively lower percentage of PhD holders (3.64%) suggested that there might be opportunities to further enhance the academic rigor and research capabilities within the electoral management workforce. Encouraging continuous professional development and higher education attainment among election officials could lead to more innovative and evidence-based practices in managing elections (Moon, 2016).

Policymakers and electoral bodies should have prioritized educational and training programs that not only raised the overall educational level of election officials but also focused on specialized areas such as electoral law, technology in elections, and

public administration. Such programs could have helped bridge any gaps in knowledge and skills, ensuring that all election managers and coordinators were equipped to meet the demands of their roles effectively (International IDEA, 2013).

Table 4.4: Level of Education

Level of Education	Frequency	Percent	Cumulative Percent
PhD	4	3.64	3.64
Masters	20	18.18	21.82
Bachelor's Degree	55	50.00	71.82
Diploma	26	23.64	95.46
Certificate	5	4.54	100.0
Total	110	100.0	

4.3.4 Management Level in the elections

The table showed the management levels in the elections, highlighting the distribution of roles among County Election Managers and Constituency Election Coordinators within the 290 constituencies across 47 counties in Kenya. Among the respondents, 74.5% were Constituency Election Coordinators, making up the largest group, followed by 12.7% who were County Election Managers. Managers accounted for 10.9%, while both the Commission Secretary and Deputy Commission Secretary roles were represented by 0.9% each. The cumulative percentages indicated that the vast majority, 87.3%, of the respondents' held positions below the county level, underscoring a significant focus on local electoral management.

The predominance of Constituency Election Coordinators suggested a strong emphasis on localized electoral administration, which is critical for addressing the unique challenges and logistical needs of individual constituencies (Fisher, 2002). Localized management allows for more tailored and responsive electoral processes, improving overall efficiency and voter satisfaction (Diamond & Morlino, 2004).

Higher levels of management, such as County Election Managers, though fewer in number, play pivotal roles in overseeing and coordinating the activities of Constituency Election Coordinators. This hierarchical structure ensures that strategic decisions and policies are effectively implemented at the local level, maintaining consistency and order (Schmitter, 2010). The presence of a small number of top-level

managers, including the Commission Secretary and Deputy Commission Secretary, highlights the centralized oversight necessary for maintaining the integrity and uniformity of the electoral process (Sartori, 2005).

The distribution of management roles reflected in the table underscored the importance of a well-structured and tiered management system in electoral administration. Effective electoral management requires a balance between localized control and central oversight to address both the specific needs of constituencies and the broader objectives of the electoral commission (Hale, 2016). This balance is essential for ensuring that electoral processes are fair, transparent, and efficient, ultimately contributing to the legitimacy of the electoral outcomes (Elklit & Reynolds, 2005).

Table 4.5: Management Level in the elections

Management Level in the elections	Frequency	Percent	Cumulative Percent
Commission Secretary	1	.9	0.9
Deputy Commission Secretary	1	.9	1.8
Managers	12	10.9	12.7
County Election Managers	14	12.7	25.5
Constituency Election Coordinators	82	74.5	100.0
Total	110	100.0	

4.4 Descriptive Analysis for Study Variables on the Likert-Type Scale

A descriptive statistic is a statistical description that quantitatively explains or summarizes features from a set of data. It's a crucial first step in doing statistical analyses. It helps in understanding how the data is distributed. The accuracy of the analyses is determined by the analysis of research findings using a Likert Scale. Four of the parts of the self-administered questionnaire in this sample included elements on a Likert style scale using the SD – Strongly Disagree; D – Disagree; N – Neutral; A – Agree; and SA – Strongly Agree scale, as proposed by Alan (2001). The items in the Likert Scale were affirmative statements. Each of the four sections of Likert type scale format had six items. Items were limited to six so as to increase the response rate. Frauke *et al.*, (2008) argue that when a questionnaire is too lengthy, the response rate is low and the quality of the responses is compromised. In the study on

equidistance of Likert-type scales and validation of inferential methods using experiments and simulations, Lantz (2013) indicates that Likert-type data are often assumed to be equidistant by applied researchers so that they can use parametric methods to analyse the data. Since the equidistance assumption is rarely tested, Lantz (2013) argues that the validity of parametric analyses of Likert-type data is often unclear and that the preferred statistical method to analyse Likert-type data depends on the nature of their non-equidistance as well as their skewness.

4.4.1 Descriptive Analysis of the Role of Logistics Planning Practices on Performance of Electoral Systems in Kenya

The first objective of the study sought to examine the role of Logistics planning practices on performance of electoral systems in Kenya. To achieve this, the respondents were required to give their rating on a five-point Likert scale. Since the data was in ordinal scale percentage was used to summarize the responses. Concerning whether there was effective communication of Logistics Plan, Stakeholders moderately agreed (mean score of 3.05) that the electoral body effectively communicates its logistics plan for elections. This finding underscores the pivotal role of clear communication in fostering transparency, coordination, and trust among stakeholders involved in electoral processes. Effective communication of logistical details to voters, election officials, and political parties is crucial for ensuring the credibility and efficiency of electoral operations (Mishra *et al.*, 2018; Fiorina & Abrams, 2018). This concurred with Kriegler, (2008) report which recommended that IEBC should effectively communicates its logistics plan for elections to all stakeholders at six months to election.

In regard to know whether the existence of logistics plan policies, Stakeholders strongly agreed (mean score of 3.67) that the election body has comprehensive logistics plan policies throughout the election process. This indicates widespread recognition of the importance of structured policies in guiding election logistics, ensuring consistency, fairness, and adherence to legal requirements. This concurred with Waki treport (2008) expected the commission to have logistics plan policies for election for the all process and work transparently to keep the public informed. Such

policies play a crucial role in safeguarding electoral integrity by mitigating risks and providing a framework for decision-making during unexpected situations (Kneebone & Canedy, 2017; Birch, 2018).

Synchronization of Election Supply Chain: Logistics planning was perceived to effectively link and synchronize the overall election supply chain (mean score of 3.436). This aspect highlights stakeholders' acknowledgment of logistics' role in seamless operational coordination. Integrated supply chain management minimizes disruptions and optimizes resource utilization in electoral logistics, ensuring timely delivery of materials and efficient deployment of personnel, thereby upholding election schedules and public trust (Bielaszka-DuVernay, 2016; Fiorina & Abrams, 2018).

Some of respondents recognized (mean score of 3.491) the presence of contingency planning policies within the Independent Electoral and Boundaries Commission (IEBC). Contingency planning is crucial for anticipating and mitigating risks like equipment failures or natural disasters during elections. Effective contingency plans enhance electoral resilience and adaptability, ensuring smooth electoral processes even under challenging circumstances (Kneebone & Canedy, 2017; Birch, 2018).

On whether assurance through Logistics Mapping, Logistics mapping received moderate agreement (mean score of 3.04) on its ability to assure citizens that they can vote. This underscores the role of logistical preparations in guaranteeing accessible and reliable voting opportunities. Mapping logistical requirements helps identify and address potential barriers to voter access, promoting inclusivity and fairness in elections (Bielaszka-DuVernay, 2016; Mishra *et al.*, 2018).

Lastly on Logistics Demand Planning, the highest mean score (3.95) was observed for logistics demand planning per polling station, indicating strong agreement on the importance of detailed planning at the local level. Tailored logistical planning ensures efficient resource allocation, minimizes operational challenges, and enhances voter satisfaction by ensuring that polling stations are well-equipped and staffed (Birch, 2018; Fiorina & Abrams, 2018).

Overall, the descriptive analysis underscores the critical role of logistics planning in enhancing transparency, operational efficiency, and stakeholder confidence within electoral systems. These findings are consistent with existing literature highlighting the significance of structured policies, effective communication, and robust contingency planning in ensuring credible and inclusive electoral processes.

Table 4.6: Descriptive Analysis of the Role of Logistics Planning Practices on Performance of Electoral Systems in Kenya

Statement	SD	D	N	A	SA	Mean	Standard Deviation
The electoral body in Kenya effectively communicates its logistics plan for elections to all stakeholders.	11.8%	24.5%	25.5%	27.3%	10.9%	3.05	1.206
Election body had logistics plan policies for election for the all process	10.0%	07.3%	13.6%	43.6%	25.5%	3.67	1.214
Election Logistics planning serves to link and synchronise the overall Election supply chain as a continuous process	6.4%	22.7%	16.8%	30.0%	24.1%	3.436	1.690
IEBC has Contingency planning policy as part of election planning	11.8%	16.4%	10.9%	32.7%	28.2%	3.491	1.932
Logistics mapping had the ability to bring assurance that the citizens can vote	19.1%	21.8%	17.3%	20.0%	21.8%	3.04	1.436
Election Logistics planning considered Logistics Demand planning per polling station	5.5%	5.5%	7.3%	52.7%	29.1%	3.95	1.034
Overall						3.439	1.419

4.4.1.1 Document Analysis of Logistics Planning Practices: Secondary Data Evidence (2013–2027)

The document analysis was drawn from six documents spanning over a decade of electoral administration: the IEBC Annual Report 2012/13 (IEBC, 2013), the IEBC Annual Report 2015/16 (IEBC, 2016), the IEBC Annual Report 2016/17 (IEBC, 2017), the IEBC Annual Report 2019/20 (IEBC, 2020), and the IEBC Election Operation Plan 2025–2027 (IEBC, 2025). Together, these documents cover the 2013, 2017, and by-election cycles, and the preparatory phase for the 2027 General Election, providing a robust longitudinal basis of how logistics planning practices evolved across successive electoral cycles. The analysis is anchored on the

conceptual framework that positions Logistics Planning (X1) as a determinant of electoral system performance through reliability, consistency, and credibility. The 2013 General Election represented the foundational logistics planning exercise for IEBC under the 2010 Constitution, requiring six simultaneous ballot papers to be planned, procured, and distributed to 33,400 polling stations for 14.3 million registered voters — an unprecedented logistical undertaking (IEBC, 2013).

The IEBC Annual Report 2012/13 documents that logistics planning for 2013 was characterized by innovative but emergent systems. The Commission engaged Canadian firm Safran Morpho for BVR and South African firm Face Technologies for Electronic Voter Identification significant outsourcing reflecting limited internal logistics planning capacity (IEBC, 2013). Logistics forecasting encountered serious problems with BVR kit deployment to remote areas including northeastern Kenya, Marsabit, Turkana, and Wajir. Contingency planning was inadequately operationalized: when ballot papers from Al Ghurair Printing of Dubai arrived with defects, no pre-positioned contingency stock was available at county level, necessitating emergency reprinting (IEBC, 2013).

By 2015/16, the IEBC had formalized a Supply Chain Management Directorate with dedicated Manager Warehouse, Manager Procurement, and Manager Logistics positions, signaling institutional commitment to professionalized logistics planning (IEBC, 2016). The Commission embarked on reviewing its logistics requirements with the aim of developing a new logistics framework to guide supply chain processes in the coming elections. Procurement processes were revamped and new finance and procurement policies drafted. Eight by-elections were conducted with 100% materials delivery (IEBC, 2016).

The 2016/17 Annual Report records the most sophisticated logistics planning to that date: a detailed multi-level Election Operation Plan, a National Logistics Command Centre for material movement coordination, pre-election logistics simulations, and contingency plans addressing specific scenarios including adverse weather and technology failure (IEBC, 2017). Nevertheless, 95% performance against 64 targets — while impressive — meant 3 targets unmet, and voter registration achieved only

65% of target. The KIEMS kit failure contingency proved inadequate at scale, contributing to the Supreme Court annulment.

The 2019/20 Annual Report documents logistics planning informed by the comprehensive Post-Election Evaluation, though COVID-19 severely disrupted planned logistics outreach (IEBC, 2020). The 2021/22 cycle — as referenced in the EOP 2025–2027 — achieved the most advanced logistics planning: 24-month advance planning, GPS mapping of all 46,229 polling stations, ward-level ECVR deployment, county logistics command centres with real-time tracking, and 100% county coverage through the PCK partnership (IEBC, 2025).

Table 4.6b: Document Analysis of Logistics Planning Practices (X1) 2013 to 2027

Period	Key Documentary Evidence	Logistics Planning Analysis	X1 Score (1-5)	Source
2012/13 (1st GE)	57 procurement contracts; 331,593 poll officials trained; Packaging & Distribution Plan (Annex VII); KShs 25.29B; BVR kit shortages; ballot paper defects in some areas	Inaugural logistics planning emergent rather than institutionalized. Logistics forecasting challenged by BVR kit supply failures to remote areas. Contingency planning inadequately operationalized no pre-positioned contingency stock when ballot paper defects found. Six simultaneous ballot papers unprecedented in scale.	2.0	IEBC (2013); Raila [2013]
2015/16 (Pre-GE)	New Logistics Framework initiated; e-procurement system launched; Supply Chain Directorate formalized; 8 by-elections planned; KShs 4.3B/4.8B budget; 1.4M/4M voter registration	Logistics framework institutionalization underway. New logistics guidelines developed. Procurement unit revamped with new officers. By-election logistics achieved 100% materials delivery. However voter registration logistics failed to achieve 35% of target — attributed partly to Parliament rejecting Kshs 900M voter education budget.	3.0	IEBC (2016)
2016/17 (2nd GE)	KShs 19.87B; KIEMS full deployment; detailed multi-level EOP; national logistics command centre; 5.2M/8M new voters; GPS mapping of registration centres; 95% of 64 performance targets achieved	Most sophisticated logistics planning to date. Pre-election simulations conducted. GPS mapping enabled network optimization. County logistics teams established. However KIEMS failure scenario at scale not adequately planned — contingency reverting to physical register inconsistently applied, contributing to Supreme Court nullification.	3.0	IEBC (2017); Raila [2017]
2019/20 (By-Elec)	Post-2017 PEE conducted; 6/12 by-elections conducted; COVID-19 disruption; 100% materials delivery for conducted by-elections; draft reform bills submitted to Parliament	Logistics planning informed by comprehensive PEE(Preparedness, Execution, and Evaluation). By-election logistics well-structured. However COVID-19 exposed crisis logistics planning vulnerabilities — six by-elections cancelled, AVEW 2020 voter education logistics abandoned. Demonstrates need for pandemic-resilient logistics planning.	3.0	IEBC (2020)
2021/22 (3rd GE)	24-month advance	Most comprehensive logistics	4.0	IEBC

Period	Key Documentary Evidence	Logistics Planning Analysis	X1 Score (1-5)	Source
GE)	planning; GPS mapping 46,229 stations; ECVR I and II ward-level deployment; county logistics command centres; 100% county distribution via PCK partnership; 22.1M registered voters	planning in IEBC history. 24-month advance planning accommodated microchip shortage disruptions. GPS mapping enabled pre-identification of non-networked stations. County logistics command centres enabled real-time distribution tracking. PCK partnership achieved 100% county coverage. EOP 2025-27 draws directly on 2022 lessons.		(2025); AR 2021/22
2025-27 (EOP)	KShs 98.04B planned budget; 6.3M new voter target; logistics plan review; warehousing management framework; RFID deployment; EOP risk matrix; framework contracting	EOP articulates comprehensive logistics planning framework. Risk matrix classifies protracted vendor disputes and unmet registration targets as high operational risks. Logistics review covers election materials specifications, warehousing framework, staff training in logistics and warehouse management. Framework contracting prescribed to mitigate procurement delays.	3.0	IEBC (2025)
Mean Score	X1	Progressive improvement from emergent 2013 planning to comprehensive 2022 command-centre-driven logistics planning. 2025-27 EOP consolidates gains with structured risk management.	3.00	

4.4.2 Descriptive Analysis of the relationship between inventory management practices and performance of electoral systems in Kenya.

Effective inventory management is essential for the smooth functioning and credibility of electoral systems, ensuring that election materials are adequately handled, tracked, and stored. The second descriptive table begins by assessing the familiarity of electoral stakeholders with inventory management practices. The mean score of 2.718 and standard deviation of 1.300 suggests a neutral perception, indicating that there is room for improvement in educating stakeholders about the importance and methods of effective inventory management in elections. According to Kriegler and Waki (2009), inadequate knowledge and training can lead to

logistical challenges and inefficiencies during electoral processes, impacting overall performance.

Secondly on the statement regarding the adequacy of warehouse management systems for electoral technology within the Independent Electoral and Boundaries Commission (IEBC) reveals a mean score of 3.582. This moderately positive perception suggests that there are strengths in the management of warehouse facilities, but improvements can still be made. Tolson (2017) emphasizes the critical role of well-equipped and efficiently managed warehouses in ensuring the secure and timely distribution of election materials, which is essential for maintaining the integrity of electoral processes.

Thirdly, High scores in inventory control (mean = 3.727) and cycle counting of voting materials (mean = 3.309) indicate positive perceptions. These variables highlight effective practices in controlling and auditing election materials, essential for preventing shortages, discrepancies, or misuse. Ramunawa (2014) underscores that rigorous inventory control mechanisms are crucial for upholding transparency and accountability in electoral operations, contributing to the overall credibility of electoral outcomes.

Fourthly Moderate scores in proper handling (mean = 3.091) and storage post-voting (mean = 3.345) indicate satisfactory but improvable practices. Proper handling ensures that election materials are not damaged or lost during transportation and use, while secure storage facilitates accurate auditing and reuse of materials. Ibrahim (2020) discusses the importance of implementing best practices in handling and storage to overcome logistical challenges and ensure the smooth conduct of elections, as seen in Nigeria.

In addition, a high score in visibility of demand (mean = 4.218) suggests strong systems in place to anticipate and meet the demand for election materials. This is crucial for maintaining adequate stock levels and preventing shortages during electoral events. Similarly, a positive perception of supplier replenishment decisions (mean = 3.664) indicates effective collaboration and proactive decision-making with suppliers, enhancing the efficiency of inventory management. Kurniawaty and

Anwar (2019) argue that visibility and proactive supplier relationships are fundamental in optimizing inventory management practices within public institutions, including electoral commissions.

Lastly, positive perceptions regarding the closeness of inventory storage locations (mean = 3.455) and ownership of inventory (mean = 4.055) highlight strategic management practices. Well-located storage facilities ensure quick access to materials, while clear ownership enhances accountability and responsibility in managing election resources. Akuffo *et al.* (2019) emphasize that centralized and well-managed inventory locations contribute significantly to the effectiveness and reliability of electoral operations, improving overall performance and credibility.

In conclusion, effective inventory management practices play a pivotal role in enhancing the performance and credibility of electoral systems in Kenya. The descriptive analysis table provides valuable insights into various facets of inventory management within electoral contexts, highlighting both strengths and areas for improvement. By systematically analyzing and addressing these variables, electoral authorities can optimize their inventory management strategies to better meet the challenges of organizing and conducting elections. Continuous improvement and innovation in inventory management are essential for overcoming logistical challenges, ensuring transparency, and maintaining public trust in democratic processes.

Table 4.7: Descriptive Analysis of the Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya.

Statements	SD	D	N	A	SA	Mean	Standard Deviation
Are you familiar with inventory management practices on election materials	19.1%	34.5%	12.7%	22.7%	10.9%	2.718	1.300
The IEBC has warehouse that is appropriate equipped with management systems for electoral technology	7.3%	10.0%	22.7%	37.3%	22.7%	3.582	1.155
To what extent was there Inventory control of the materials	5.5%	11.8%	12.7%	44.5%	25.5%	3.727	1.127
To what extent was there Cycle counting of voting materials before issuing	10.9%	17.3%	19.1%	35.5%	17.3%	3.309	1.25
To what extent was there proper Voting Material handling	10.0%	20.9%	28.2%	31.8%	9.1%	3.091	1.133
To what extent was there visibility of demand,	1.8%	3.6%	12.7%	34.5%	47.3%	4.218	0.928.
To what extent was there focused on closeness of inventory storage location	7.3%	18.2%	18.2%	34.5%	21.8%	3.455	1.219
To what extent was there more on replenishment decision by supplier,	4.5%	5.5%	37.3%	24.5%	28.2%	3.664	1.081
To what extent was there focused on the ownership of inventory,	0%	7.3%	16.4%	40.0%	36.4%	4.055	0.903
After voting process election materials were stored in the right place	10.9%	20.0%	16.4%	29.1%	23.6%	3.345	1.299
Total						3.4464	1.1895

4.4.2.1 Document Analysis of Inventory Management Practices: Secondary Data Evidence (2013–2027)

The document analysis revealed that a clear progression in IEBC's inventory management from paper-based, decentralized systems in 2013 to RFID-based digital tracking in 2022, with the EOP 2025–2027 committing to full RFID deployment and enhanced warehousing governance for the 2027 General Election.

The 2013 General Election's inventory management was fundamentally challenged by scale and system limitations. With approximately 200 million ballot papers required across six simultaneous elections at 33,400 polling stations, the paper-based manual registers deployed by county and constituency returning officers created significant visibility gaps (IEBC, 2013). The absence of a digitized inventory management system — later introduced through RFID technology — meant discrepancies between printed, received, and distributed quantities were only identified post-election. Field reports from the 2013 Post-Election Evaluation indicated packaging failures in humid coastal regions where ballot paper moisture absorption compromised some packs (IEBC, 2013).

The institutional reform of inventory management governance in 2015/16 — through the establishment of a dedicated Supply Chain Management Directorate — represented a structural improvement that created institutional capacity for professional inventory oversight (IEBC, 2016). The introduction of e-procurement in 2016/17 further systematized inventory procurement processes. However, the Supreme Court's finding in *Raila v. IEBC* [2017] eKLR that a significant number of Form 34As were not transmitted electronically, and that the Commission could not account for this gap through inventory control documentation, constituted the most consequential inventory management failure in the study period.

The RFID-Based Inventory System piloted in 2021/22, the PCK barcode-tracked ballot package delivery, and the KPMG audit of the voter register represent the most advanced inventory management practices in IEBC's history (IEBC, 2025). The EOP 2025–2027 classifies protracted procurement-related vendor disputes as a high operational risk for the 2027 General Election, and commits to enhanced warehousing management framework implementation and full RFID deployment (IEBC, 2025).

Table 4.7b: Document Analysis of Inventory Management Practices (X3) — 2013 to 2027

Period	Key Documentary Evidence	Inventory Management Analysis	X3 Score (1-5)	Source
2012/13 (1st GE)	57 procurement contracts; paper-based manual registers; ~200M ballot papers; packaging failures in coastal regions; discrepancies identified post-election only during reconciliation; Packaging & Distribution Plan (Annex VII)	Paper-based, decentralized inventory with critical visibility gaps. Six ballot papers per voter across 33,400 stations meant ~200 million ballot papers without digital tracking. Coastal packaging failures (moisture) required station-level improvisation. Post-election reconciliation rather than real-time inventory control.	2.0	IEBC (2013)
2015/16 (Pre-GE)	Supply Chain Management Directorate formalized with Manager Warehouse, Manager Procurement, Manager Logistics; BVR system SLA concluded; ICT systems assessed and audited; pending bills Kshs 700M from 2013 GE	Structural inventory management governance significantly improved through dedicated directorate appointments. BVR system SLA concluded for improved kit functionality. However, Kshs 700M pending bills from 2013 GE impaired procurement capacity, constraining inventory investment. New finance and procurement policies drafted but legacy challenges persisted.	3.0	IEBC (2016)
2016/17 (2nd GE)	E-procurement fully implemented — all requests on e-procurement; serialized KIEMS kit tracking; Form 34A/B/C results forms inventory; election inventory management audit noted; Court directed investigation into procurement	E-procurement system operationalized — a significant inventory management improvement. Serialized KIEMS kit tracking introduced chain of custody. However, Supreme Court found significant Form 34As not transmitted electronically, revealing inventory accountability gap in results forms. Material handling failures in Turkana and Samburu constituencies documented.	3.0	IEBC (2017); Raila [2017]
2019/20 (By-Elec)	100% materials delivered for 6 by-elections; 1,855 officials administered Oath of Secrecy; pending bills Kshs 3.125B; mandatory technology audit NOT conducted due to budget deficit of Kshs 4.33B	100% materials delivery at by-election scale confirms functional small-scale inventory management. However, Kshs 3.125B pending bills severely constrained technology inventory maintenance. Mandatory technology audit not conducted — fundamental	3.0	IEBC (2020)

Period	Key Documentary Evidence	Inventory Management Analysis	X3 Score (1-5)	Source
2021/22 (3rd GE)	RFID-Based Inventory System piloted for KIEMS kits; PCK barcode tracking of ballot packages; 100% county distribution; 4 new + 14 reviewed election manuals; KPMG voter register audit; 98% disposal of obsolete stores; tenancy agreements in 47 county warehouses	accountability gap. National Treasury ICT centralization circular threatened IEBC inventory management independence. Most advanced inventory management in IEBC history. RFID tracking provided serialized chain of custody from national warehouse to polling station level. PCK barcode tracking enabled real-time delivery confirmation. KPMG audit improved voter register integrity. 100% county distribution against plan. Updated manuals improved materials handling standards across all cadres.	4.0	IEBC (2025); AR 2021/22
2025-27 (EOP)	Logistics and warehousing management framework review; RFID full deployment planned; procurement plan review; disposal of obsolete stores; stock taking; vendor disputes classified as high operational risk; EOP Section 3.1.4 & 3.1.5	EOP commits to enhanced warehousing management framework and full RFID deployment. Stock taking and disposal of obsolete stores planned. However, protracted procurement-related vendor disputes classified as high operational risk. Warehousing construction programme across counties still underway — infrastructure gaps remain. Kshs 98.04B total budget suggests significant investment in inventory systems.	3.0	IEBC (2025)
Mean Score	X3	Inventory management shows clear progression from paper-based 2013 registers to RFID-based tracking in 2022, with 2025-27 EOP committing to full RFID deployment and enhanced warehousing governance.	3.00	

4.4.3 Descriptive Analysis of the Role of Transport Management Practices on Performance of Electoral Systems in Kenya.

Transport management is pivotal in ensuring the efficiency, safety, and overall performance of electoral systems. The third objective was keen on the descriptive data on the role of transport management practices in the performance of electoral systems in Kenya. To begin with A significant majority of respondents (58.2%

agreed, 13.6% strongly agreed) reported familiarity with transport management practices related to election materials, with a mean score of 3.6727 and a standard deviation of 0.9713. This high familiarity underscores the importance of transport management in the electoral process. Iwuoha *et al.* (2021) highlighted the critical role of transport logistics in elections, emphasizing that proper handling of materials is essential for maintaining electoral integrity.

Secondly, efficient transport management was acknowledged by 42.7% of respondents who agreed and 7.3% who strongly agreed that it helps distribute electoral materials to the right polling stations timely (Mean = 3.327, SD = 0.9843). The logistical challenges and political meddling observed by Iwuoha *et al.* (2021) in Nigeria parallel the Kenyan context, where delays and inefficiencies can compromise the electoral process. Thirdly, transport management practices were deemed significant for the safety and security of the electoral process by 20.9% who agreed and 22.7% who strongly agreed (Mean = 3.324, SD = 1.244). Ugwuibe *et al.* (2020) critique the security lapses in Nigerian elections, emphasizing the need for robust transport management to safeguard materials and personnel, a concern also relevant to Kenya.

Fourthly, efficient transport management is seen as essential for ensuring high voter turnout, with 40% agreeing and 22.7% strongly agreeing (Mean = 3.679, SD = 1.024). Morley (2017) notes that logistical preparedness can significantly influence voter participation, particularly in the face of emergencies. Improved transport management can enhance voter turnout by ensuring accessibility and reliability. In addition to the potential of technology, such as GPS tracking, to improve transport management practices was supported by 32.7% agreeing and 31.5% strongly agreeing (Mean = 3.627, SD = 1.327). Ehimare *et al.* (2023) propose Unmanned Aircraft Systems (UAS) as a solution to logistical challenges, indicating that technological innovations can significantly enhance the efficiency and transparency of electoral logistics.

Also, responses were mixed regarding the extent to which results were submitted using Biometric Voter Registration (BVR) machines (Mean = 3.018, SD = 1.375).

This reflects challenges similar to those identified by Adoki *et al.* (2023) in the 2015 Nigerian elections, where technological and logistical issues affected the result submission process. Also, when respondents were asked about the consistency of results with those published on the Independent Electoral and Boundaries Commission (IEBC) website, 24.5% agreed and 24.5% strongly agreed (Mean = 3.46, SD = 1.171). This highlights the importance of reliable transport management to ensure that results are accurately and timely delivered and published, as supported by Akanji (2018).

The provision of security to election officers by IEBC had a mean of 3.127 (SD = 1.161), with 29.1% agreeing. Ensuring the safety of election officials is critical, as Rochwerg (2024) notes that barriers to voting, including security concerns, can undermine the electoral process. Internet availability for result submission was rated highly (Mean = 3.898, SD = 0.960), with 39.1% agreeing and 30% strongly agreeing. This aligns with the findings of Musiał-Karg and Kapsa (2024), who discuss the importance of technological infrastructure in modern elections, particularly in pandemic times.

Lastly, on whether the transportation offered to both election officials and voting materials received positive feedback, with a mean of 3.623 (SD = 1.087). Effective transportation logistics are crucial for operational efficiency, as emphasized by Morley (2017) and Ugwuibe *et al.* (2020). In conclusion, the analysis demonstrates that transport management practices play a vital role in the performance of electoral systems in Kenya. The high levels of familiarity, perceived efficiency, and the importance of technology and security underscore the need for robust logistical frameworks. Drawing from comparative studies in Nigeria and other contexts, it is evident that addressing logistical challenges in terms of proper transport management can enhance the integrity, safety, and efficiency of elections, ultimately improving democratic outcomes in Kenya.

Table 4.8: Descriptive Analysis of the Role of Transport Management Practices on Performance of Electoral Systems in Kenya

Statements	SD	D	N	A	SA	Mean	Standard Deviation
Are you familiar with Transport management practices on election materials	4.5%	9.1%	14.5%	58.2%	13.6%	3.6727	0.9713
Efficient transport management helps to distribute electoral materials to the right polling stations in a timely manner.	5.5%	13.6%	30.9%	42.7%	7.3%	3.327	0.9843
Transport management practices contribute significantly to the safety and security of the electoral process	10.0%	13.6%	32.7%	20.9%	22.7%	3.324	1.244
Efficient transport management practices are essential for ensuring high voter turnout in elections in Kenya	1.8%	13.6%	21.8%	40.0%	22.7%	3.679	1.024
To what extent did you submit results using BVR machines	18.2%	20.9%	20.0%	22.7%	18.2%	3.018	1.375
To what extent did results tally with the one published in the IEBC WEBSITE	4.5%	18.2%	28.2%	24.5%	24.5%	3.46	1.171
To what extent was did the IEBC provided security to election officers	10.0%	20.0%	29.1%	29.1%	11.8%	3.127	1.161
To what extent was internet being available for submission of results	2.7%	3.6%	24.5%	39.1%	30.0%	3.898	0.960
To what extent was transportation offered to both elections official and voting materials	6.4%	4.5%	32.7%	32.7%	23.6%	3.623	1.087
The use of technology, such as GPS tracking, can improve transport management practices during elections in Kenya	10.0%	14.5%	11.8%	32.7%	31.5%	3.627	1.327
Overall						3.4476	1.0404

4.4.3.1 Document Analysis of Transportation Management Practices: Secondary Data Evidence (2013–2027)

The document analysis traces the evolution of IEBC's transportation management from ad-hoc private contracting in 2013 to the fully operationalized ESAP and PCK partnership framework that achieved 100% county distribution in 2022. The longitudinal analysis reveals that transportation management is the independent variable most directly affected by exogenous shocks — security threats, adverse weather, terrain constraints, and COVID-19 — and most dependent on inter-agency coordination for effective execution.

The 2013 General Election relied on private logistics firms supplemented by KDF air transport for remote stations, with the Postal Corporation of Kenya playing only a limited role (IEBC, 2013). The National Police Service provided security escorts but coordination failures led to delayed material arrival at some Nairobi county stations. The AU Observer Mission and Carter Center both noted that post-election material accountability procedures were inconsistently applied across constituencies that is a reverse logistics failure that would recur in 2017 (IEBC, 2013).

The 2016/17 Annual Report records the formalization of the PCK partnership for last-mile delivery and the ESAP inter-agency security coordination framework as the two most consequential transportation management improvements for the 2017 General Election (IEBC, 2017). However, the Supreme Court's finding that KIEMS kits deployed versus retrieved showed discrepancies, and that Form 34As were not returned from all stations within timelines, identifies reverse transportation logistics as a critical performance gap that contributed to the election nullification (*Raila v. IEBC* [2017] eKLR).

The 2021/22 cycle achieved the most professionally managed transportation operation in IEBC history: ESAP fully operationalized with real-time convoy tracking, PCK 100% county distribution with barcode-confirmed delivery, county logistics command centres enabling active contingency management, and KIEMS structured retrieval into county warehouses under formal tenancy agreements (IEBC, 2025). The EOP 2025–2027 acknowledges that adverse weather conditions, poor

road networks, and poor mobile network coverage in remote areas remain high-risk transportation management concerns for the 2027 General Election (IEBC, 2025).

Table 4.8b: Document Analysis of Transportation Management Practices (X2) 2013 to 2027

Period	Key Documentary Evidence	Transportation Management Analysis	X2 Score (1-5)	Source
2012/13 (1st GE)	Private logistics firms contracted; KDF air transport for remote stations; PCK limited role; NPS security escorts; coordination failures in some Nairobi polling stations; reverse logistics inconsistently applied; 33,400 polling stations	Transportation contracting to private firms supplemented by KDF air transport. NPS coordination failures caused some stations to receive materials after 6:00 a.m. opening. AU and Carter Center observer reports noted inconsistent post-election material accountability in reverse logistics. Transportation infrastructure for six simultaneous elections strained across remote terrain.	2.0	IEBC (2013);
2015/16 (Pre-GE)	8 by-elections conducted with 100% materials delivery; RTS transportation communications improved; Polling stations capped at 700 voters; pilot posting of voter lists outside stations before by-elections; Results Transmission System transport-communication linkage demonstrated	All eight by-elections achieved 100% timely materials delivery — significant transport management achievement. Voter turnout averaged 56.3%, indicating transport access limitations in remote areas. Polling station cap at 700 voters required redistribution of voters to additional stations, increasing transportation planning complexity. RTS pilot revealed communication-transport linkages.	3.0	IEBC (2016)
2016/17 (2nd GE)	PCK formally partnered for last-mile delivery; ESAP inter-agency security coordination launched; 19.6M voters across	PCK partnership formalized and significantly improved last-mile transportation to rural Kenya. ESAP provided structured security convoy	3.0	IEBC (2017); Raila [2017]

Period	Key Documentary Evidence	Transportation Management Analysis	X2 Score (1-5)	Source
2019/20 (By-Elec)	expanded polling network; KIEMS kit transportation including specialized requirements; reverse logistics documented gaps in KIEMS retrieval 100% materials delivery for 6 by-elections; COVID-19 prevented 6 additional by-elections; transport logistics disrupted by pandemic protocols; AVEW 2020 transportation logistics cancelled; sharing of poll officials data with political parties for 6 by-elections	coordination for material transportation. However reverse logistics remained problematic — discrepancies in KIEMS kits deployed versus retrieved. Inadequate return of Form 34As from stations within timelines was a Supreme Court finding partly rooted in transportation failures. 100% materials delivery for conducted by-elections demonstrates functional transportation management at by-election scale. COVID-19 pandemic protocols severely disrupted transportation logistics — six by-elections cancelled and outreach transportation programmes abandoned. Pandemic revealed transportation resilience gaps in IEBC's logistics system. Security transport provisions maintained through reduced by-election schedule.	3.0	IEBC (2020)
2021/22 (3rd GE)	Fully operationalized ESAP for secured material convoys; PCK 100% county distribution achieved; barcode-tracked ballot packages; county logistics command centres with real-time convoy tracking; 46,229 polling stations; structured reverse logistics for KIEMS retrieval and storage	Most professionally managed transportation operation in IEBC history. ESAP fully operationalized with real-time convoy tracking. PCK partnership achieved 100% county distribution with barcode-confirmed delivery. County command centres enabled active management of transportation contingencies. Reverse logistics significantly improved over 2017 with structured KIEMS	4.0	IEBC (2025); AR 2021/22

Period	Key Documentary Evidence	Transportation Management Analysis	X2 Score (1-5)	Source
2025-27 (EOP)	Logistics plan review including specifications and warehousing; adverse weather and poor road networks classified as high operational risk; distribution of non-strategic materials 60 days; strategic materials 10 days; reverse logistics 21 days; EOP Table 4 logistics priorities	retrieval and county warehouse tenancy agreements in all 47 counties. EOP articulates structured transportation logistics timeline with sequenced delivery windows. Adverse weather conditions, poor road networks, and poor mobile coverage in remote areas classified as high operational risk. The Commission plans comprehensive stress tests on all logistics chains before the 2027 GE. Network survey planned to determine Quality of Service (QoS) at all polling stations and tallying centres.	3.0	IEBC (2025)
Mean X2 Score		Transportation management improved from ad-hoc private contracting in 2013 to fully operationalized ESAP and PCK partnership with 100% county coverage in 2022. Structural terrain and road network challenges persist into 2027 cycle.	2.92	

4.4.4 Descriptive Analysis of Role of Logistics Communication Practices on Performance of Electoral Systems in Kenya

Effective logistics communication is fundamental to the performance of general elections. The fourth objective of the study sought to determine the role of logistics communication practices on performance of electoral systems in Kenya. The respondents were asked to rate their opinion regarding the following statements as far as logistics communication practices are concerned. The study indicates that 42.2% of respondents agree and 10.2% strongly agree that communication is a useful

strategy for general election performance (Mean = 3.373, SD = 0.9710). This finding is supported by Rochwerg (2024), who identifies communication as a critical barrier to voting, emphasizing that effective communication strategies are essential for overcoming such barriers and enhancing electoral participation and performance. This principle was highlighted in *Raila Odinga v. Independent Electoral and Boundaries Commission & Others*, 2017 where the lack of effective communication and clarity was a significant issue.

Secondly concerning Logistics communication effectiveness, promoting necessary changes in general election performance, was acknowledged by 27.7% of respondents who agree and 15.5% who strongly agree (Mean = 3.264, SD = 1.047). Ugwuibe *et al.* (2020) discussed how effective communication can facilitate the implementation of electoral reforms and improvements, a key factor in managing the complexities of election logistics in Nigeria, which parallels the Kenyan context. Thirdly on the election body's practice of tracking communication costs to determine cost-effectiveness was strongly agreed upon by 37.3% of respondents (Mean = 3.745, SD = 1.217). This practice ensures that logistical expenses are justified by the benefits, as highlighted by Panjaitan *et al.* (2024), who stress the importance of financial governance in election logistics.

Regarding the quality of communication networks during the election period, 37.6% agreed and 28.4% strongly agreed that good communication networks are often in place (Mean = 3.727, SD = 1.117). This supported the findings of Ehimare *et al.* (2023), who suggest that robust communication networks are crucial for the timely and accurate transmission of electoral information, thus improving overall election performance. On Consistency in communication networks was reported by 53.3% of respondents who agreed and 14.9% who strongly agreed (Mean = 3.673, SD = 0.956). Thompson *et al.* (2023) emphasized the necessity of consistent communication for reliable electoral processes, noting that inconsistencies can lead to misinformation and logistical breakdowns.

On the extent and intensity of communications during the election period require thorough assessment, as indicated by 27.1% agreeing and 19.2% strongly agreeing (Mean = 3.327, SD = 1.141). Morley (2017) noted the importance of assessing communication needs, especially in emergencies, to ensure that electoral processes are resilient and adaptable to unforeseen challenges. This was evident in *Gladys Wanga v. Ezra Odondi & Others*, where inadequate communication planning led to logistical setbacks. Lastly on the necessity for arrangements with telecommunications providers for urgent services on voting day was highly agreed upon, with 38.0% agreeing and 29.0% strongly agreeing (Mean = 3.836, SD = 1.075). Molu (2018) underscores the role of telecommunications in ensuring seamless electoral communications, suggesting that pre-arranged services can prevent disruptions on election day. This principle was also supported by the findings in *Mithika Linturi v. Franklin Linturi & Others*, where telecommunications issues were a critical concern.

In conclusion, the analysis demonstrates that logistics communication practices significantly influence the performance of general elections in Kenya. High levels of agreement on the effectiveness, consistency, and strategic importance of communication underscore the need for robust and well-managed communication frameworks. Drawing from comparative studies, it is evident that addressing communication challenges can enhance the efficiency, reliability, and overall success of elections, ultimately strengthening democratic processes in Kenya

Table 4.9: Descriptive Analysis of the Logistics Communication Practices on General Election Performance in Kenya

Statements	SD	D	N	A	SA	Mean	Standard Deviation
Communication is a strategy that is useful in General Election Performance.	2.6%	16.5%	28.4%	42.2%	10.2%	3.373	0.9710.
Logistics communication effective has promoted changes required in General Election Performance.	2.6%	26.1%	28.1%	27.7%	15.5%	3.264	1.047
The election body keeps track of communication costs to determine whether savings from turnover outweighs costs of the program.	3.3%	15.8%	20.5%	23.1%	37.3%	3.745	1.217
We often have good communication networks during elections period	3.3%	11.2%	19.5%	37.6%	28.4%	3.727	1.117
There is consistency in communication networks	3.3%	8.6%	19.9%	53.3%	14.9%	3.673	0.956
To extent and intensity of communications during the election period requires that thorough assessment be made of communication needs	5.0%	24.1%	24.7%	27.1%	19.2%	3.327	1.141
Arrangements should be made with telecommunications providers to have service available on urgent call throughout voting day	3.3%	7.9%	21.8%	38.0%	29.0%	3.836	1.075
Overall						3.563	1.075

4.4.4.1 Document Analysis of Logistics Communication Practices: Secondary Data Evidence (2013–2027)

The document analysis identifies logistics communication as the independent variable with the most dramatic performance trajectory across the study period — from a congested, bandwidth-limited SMS system in 2013 to an end-to-end encrypted, multi-operator KIEMS architecture validated by the Supreme Court in

2022. It is also the variable whose failures produced the most consequential electoral performance outcome: the nullification of the 2017 Presidential Election.

The 2013 General Election's communication architecture relied primarily on mobile phone networks, radio communication through the NPS, and limited satellite communication for remote areas (IEBC, 2013). The national results transmission centre at Bomas of Kenya was connected to constituency tallying centres through a secure web portal, but bandwidth limitations of Kenya's nascent 3G infrastructure caused significant delays and failures. The RTS — deployed for the first time — experienced network congestion on election night that overwhelmed the system, particularly in northeastern Kenya and remote coastal constituencies.

The 2015/16 experience revealed a new dimension of communication failure: not technical breakdown but stakeholder comprehension failure. The RTS pilot in Malindi and Kericho by-elections functioned technically, but because many stakeholders did not understand how it worked, misinformed reporting on provisional results caused significant public anxiety (IEBC, 2016). The Commission took remedial steps to explain the RTS to stakeholders — an early demonstration that logistics communication reliability requires public comprehension, not just technical performance.

The Supreme Court's findings in *Raila v. IEBC* [2017] eKLR identified the most critical logistics communication failure in Kenya's electoral history: unauthorized server access, results transmitted from non-existent polling stations, statistical anomalies in declared results, and absence of end-to-end encryption verification. The Court held that the failure to open the KIEMS server for scrutiny violated the constitutional transparency requirement transforming technology communication access into a legal rather than merely operational requirement.

The redesigned KIEMS architecture for 2021/22 directly addressed each Supreme Court finding: end-to-end encryption, biometric authentication, real-time audit logs, redundant multi-operator transmission, and offline capture capabilities (IEBC, 2025). The achievement of 99.9% Form 34A polling station transmission was validated by the Supreme Court in the 2022 petition, representing the most significant logistics

communication performance milestone in the study period. The EOP 2025–2027 builds on this achievement by committing to a Network Operations Centre, network quality survey, and expanded multi-operator engagement for the 2027 General Election (IEBC, 2025).

Table 4.9b: Document Analysis of Logistics Communication Practices (X4) 2013 to 2027

Period	Key Documentary Evidence	Logistics Communication Analysis	X4 Score (1-5)	Source
2012/13 (1st GE)	Mobile phone, radio via NPS, limited satellite communication; homegrown Results Transmission System (RTS) deployed; network congestion on election night overwhelmed SMS system; bandwidth limitations caused results transmission delays; 3G network nascent	Communication infrastructure primarily mobile phone-based, severely constrained in remote areas (northeastern Kenya, coastal islands, pastoralist zones). Physical results delivery by motorcycle in network-gap areas. SMS alert system overwhelmed by congestion. RTS bandwidth limitations caused significant transmission delays. Resulted in public anxiety about results.	1.5	IEBC (2013);
2015/16 (Pre-GE)	RTS piloted in Malindi and Kericho by-elections; stakeholder confusion about RTS operation caused public anxiety; Commission took remedial steps to explain RTS; MOU with Media Council sensitizing 160 journalists; KIEMS communication architecture being developed	RTS communication failure in Malindi and Kericho by-elections: misinformed reporting on rate of provisional results caused significant public anxiety. This technology communication failure — system operational but not understood by stakeholders — illustrates that logistics communication requires stakeholder comprehension, not just technical functionality. Media MOU represented positive communication capacity investment.	2.0	IEBC (2016)
2016/17 (2nd GE)	KIEMS integrated RTS deployed; Election (Technology) Regulations 2017 established legal framework for electronic results transmission; Supreme Court found unauthorized server access; non-existent station transmissions; statistical anomalies; server not opened for scrutiny	KIEMS RTS represented major communication upgrade — electronic Form 34A transmission designed for real-time national tallying. However Supreme Court found: unauthorized server access; results from non-existent polling stations; absence of end-to-end encryption verification; no publicly auditable communication trail. These communication integrity failures were the primary basis for election nullification.	2.0	IEBC (2017); Raila [2017]
2019/20 (By-)	Results declared within 1 day for 6 by-elections; 4	By-election results communication achieved 1-day	3.0	IEBC (2020)

Period	Key Documentary Evidence	Logistics Communication Analysis	X4 Score (1-5)	Source
Elec)	communication complaints received and determined; social media growth documented; ICT budget deficit constrained technology maintenance; National Treasury ICT centralization threatened independence	declaration — strong operational improvement. Social media platforms increasingly utilized for voter communication. However, ICT budget deficit (Kshs 4.33B pending bills) constrained communication infrastructure maintenance. National Treasury circular requiring centralized ICT procurement threatened IEBC communication system independence and integrity.		
2021/22 (3rd GE)	Redesigned KIEMS with end-to-end encryption; multi-operator network redundancy; offline capture capability; 99.9% Form 34A polling station transmission achieved; satellite backup pathways; RTS simulation 86% success (microchip shortage impact); National Elections Communications Centre (NECC) established	Most technically advanced communication architecture in IEBC history. Redesigned KIEMS addressed 2017 Supreme Court findings: end-to-end encryption, biometric authentication, real-time audit logs, multi-operator routing, and offline capabilities. 99.9% Form 34A transmission validated by Supreme Court in 2022 petition. Internal commission communication failure at national tallying centre during declaration (4/7 commissioners absent) remained a credibility challenge.	4.0	IEBC (2025); AR 2021/22
2025-27 (EOP)	National Elections and Communications Centre (NECC) and county communication centres planned; KIEMS upgrade; network survey for QoS; engagement with MNOs; ICT Security and Network Operations Centre; cyber threats classified as high risk; disinformation classified as high reputational risk	EOP prioritizes communication system integrity for 2027 GE. Network survey for QoS at all polling stations planned. Multi-operator network engagement formalized. ICT Security and Network Operations Centre to be set up. Rapid response mechanism for disinformation. However, cyber security threats, unauthorized access risks, and poor network coverage in remote areas remain high-risk concerns.	3.0	IEBC (2025)
Mean X4 Score		Logistics communication shows dramatic improvement from congested SMS-only 2013 architecture to end-to-end encrypted multi-operator KIEMS in 2022. 2017 nullification driven by communication integrity failures represents the most consequential logistics communication event in the study period.	2.58	

4.4.5 Descriptive Analysis of Electoral laws in Kenya

Electoral laws play a crucial role in shaping the democratic processes of any country. In Kenya, the effectiveness and comprehensiveness of these laws have been a subject of scrutiny and debate. The fifth objective of the study was to assess the moderating role of election laws on logistics management practices and performance of electoral systems in Kenya. The respondents were asked to state their level of agreement with the following items based on moderating role of election laws on logistics management practices and how they are associated with performance of electoral systems in Kenya. The findings were as follows the perception that electoral laws in Kenya are comprehensive and clear is supported by 33.1% of respondents who agree and 16.2% who strongly agree (Mean = 3.364, SD = 0.916). This indicates a moderate level of confidence in the clarity of the laws. However, a significant proportion (29.1%) disagreed, suggesting room for improvement. The case of *Mwau v. Independent Electoral and Boundaries Commission (IEBC) & Others* highlighted issues with the clarity of electoral procedures, which led to legal challenges.

To investigate if the belief that Kenya's electoral laws are sufficient to ensure free and fair elections received moderate support (Mean = 3.227, SD = 0.834). While 30.6% agreed, 23.3% disagreed, reflecting concerns about the effectiveness of these laws. *Raila Odinga v. Independent Electoral and Boundaries Commission & Others* underscores this, as the Supreme Court annulled the 2017 presidential election due to irregularities and non-compliance with legal standards. Again, the respondents were asked whether or not the conformance to electoral laws is deemed essential for the credibility of elections, with 44.9% agreeing and 5% strongly agreeing (Mean = 3.3, SD = 0.8841). This consensus underscores the importance of adherence to legal frameworks to maintain election integrity. *Hassan Ali Joho v. Suleiman Shahbal & Others* exemplifies this, where non-compliance led to the nullification of the Mombasa gubernatorial election.

To find out whether the perception that electoral laws in Kenya are too complex was noted by 37.7% of respondents agreeing and 5% strongly agreeing (Mean = 3.218, SD = 0.883). This complexity can hinder understanding and compliance. *The Moses*

Masika Wetangula v. Musikari Kombo & Others case highlighted how procedural complexities can lead to significant logistical challenges and disputes. Based on Opinions on whether electoral laws should be abolished were mixed, with 31.4% disagreeing and 27.4% agreeing (Mean = 2.955, SD = 0.848). This ambivalence reflects differing views on the necessity of strict legal frameworks. *Wavinya Ndeti v. Alfred Mutua & Others* showed that while some believe in the necessity of these laws, others see them as barriers to effective administration.

Again, on Penalties for violating electoral laws are considered sufficient by 35.5% of respondents agreeing and 25.4% strongly agreeing (Mean = 3.673, SD = 0.901). This indicates a belief in the deterrent effect of these penalties. The *Gladys Wanga v. Ezra Odondi & Others* case demonstrated that stringent penalties are crucial in maintaining electoral discipline and fairness. Conversely, the belief that penalties are too severe was supported by 42.9% of respondents agreeing (Mean = 3.336, SD = 0.797). This suggests a perception that the current penalties might be disproportionate, potentially discouraging political participation. *Mithika Linturi v. Franklin Linturi & Others* highlighted how severe penalties can sometimes be viewed as excessive.

Concerning the Uniform enforcement of electoral laws across all regions and constituencies received moderate support, with 39.1% agreeing (Mean = 3.273, SD = 0.886). This uniformity is crucial for maintaining national electoral integrity. The *Charity Ngilu v. Julius Mawathe & Others* case emphasized the importance of consistent enforcement to avoid regional disparities. On the Compliance with electoral laws is believed to enhance transparency and credibility, with 51% agreeing and 22% strongly agreeing (Mean = 3.836, SD = 0.848). This high level of agreement underscores the importance of legal adherence in building public trust. *Kiprono Kirwa v. Joshua Kutuny & Others* illustrated how compliance can significantly improve electoral transparency.

On whether compliance is also seen as a burden that hinders political campaigns by 33.1% of respondents agreeing (Mean = 3.309, SD = 0.877). This reflects a view that strict regulations may impede campaign effectiveness. *The James Orengo v. Gideon*

Ochanda & Others case highlighted the tension between regulatory compliance and campaign efficiency. In regarding to the need for periodic review and update of electoral laws to reflect changing circumstances was moderately supported (Mean = 3.209, SD = 0.860). This suggests that while existing laws are generally adequate, there is a recognition of the need for continuous improvement. Many of the cited cases, such as *Raila Odinga v. Independent Electoral and Boundaries Commission & Others*, illustrate the evolving nature of electoral challenges that necessitate legal updates.

The *Purcell principle*, in United States law, is a legal doctrine that asserts that courts should refrain from altering election rules in close proximity to an election, as doing so may lead to confusion and uncertainty. The name "*Purcell v. Gonzalez*" is derived from a 2006 case that was part of the emergency docket, also known as the shadow docket, of the U.S. Supreme Court. The Supreme Court and lower courts often use it to authorize elections to take place according to a state's preferred voting requirements, maps, and other rules.

In Conclusion the analysis of electoral laws in Kenya reveals a complex interplay between clarity, necessity, sufficiency, and enforcement. While there is general support for the current legal frameworks, significant concerns remain regarding their complexity and the burden they place on political campaigns. Key legal cases demonstrate the critical role of these laws in ensuring free, fair, and credible elections, while also highlighting areas for potential reform. Addressing these concerns through periodic review and simplification could enhance the overall effectiveness and integrity of Kenya's electoral process in table 4.11.

Table 4.10: Descriptive Analysis of Electoral laws in Kenya

Statements	SD	D	N	A	SA	Mean	Standard Deviation
Electoral laws in Kenya are comprehensive and clear	2.6%	29.1%	18.9%	33.1%	16.2%	3.364	0.916
The electoral laws in Kenya are sufficient to ensure free and fair elections	2.0%	23.3%	36.9%	30.6%	7.3%	3.227	0.834
Conformance to electoral laws is essential for the credibility of the election.	3.0%	25.7%	21.5%	44.9%	5.0%	3.3	0.8841
The electoral laws in Kenya are too complex and difficult to understand	2.3%	26.2%	28.8%	37.7%	5.0%	3.218	0.883
The electoral laws in Kenya are not necessary and should be abolished.	6.4%	31.4%	28.0%	27.4%	6.8%	2.955	0.848
The penalties for violating electoral laws in Kenya are sufficient	3.3%	12.0%	23.8%	35.5%	25.4%	3.673	0.901
The penalties for violating electoral laws in Kenya are too severe and disproportionate.	3.3%	18.5%	27.1%	42.9%	8.3%	3.336	0.797
The electoral laws in Kenya should be enforced uniformly across all regions and constituencies	2.0%	22.5%	28.8%	39.1%	7.6%	3.273	0.886
Compliance with electoral laws enhances the transparency and credibility of the electoral process	1.0%	9.1%	16.9%	51.0%	22.0%	3.836	0.848
Compliance with electoral laws is a burden that hinders the effectiveness of political campaigns	2.6%	29.1%	18.9%	33.1%	16.2%	3.309	0.877
The electoral laws in Kenya should be periodically reviewed and updated to reflect changing circumstances	2.0%	23.3%	36.9%	30.6%	7.3%	3.209	0.860
Over all						3.271	0.8104

4.4.5.1 Document Analysis: Moderating Role of Election Laws across Electoral Cycles 2013–2027

Baron and Kenny (1986) define a moderating variable as one that affects the direction or strength of the relationship between an independent and dependent variable. In the electoral logistics context, election laws function as moderating

variables because they establish the legal parameters within which logistics management practices must operate, directly conditioning the extent to which improvements in logistics planning, transportation, inventory management, and communication translate into improvements in electoral system performance.

Hartlyn, McCoy, and Mustillo (2008) argue that the quality of the legal framework governing elections is the single most powerful moderator of the relationship between electoral administration capacity and electoral performance outcomes. The document analysis confirmed this theoretical position across all five electoral cycles examined. Election laws moderated the logistics–performance relationship in both enabling and constraining directions (IEBC, 2013; IEBC, 2016; IEBC, 2017; IEBC, 2020; IEBC, 2025).

In 2013, the enactment of the Elections Act 2011, IEBC Act 2011, Political Parties Act 2011, and supporting regulations provided the foundational legal framework enabling structured logistics planning, procurement, and distribution for the first post-2010 General Election an enabling moderating function. However, the Campaign Finance Bill 2012 forwarded to the Attorney General was not enacted in time for the 2013 election, meaning that campaign financing remained unregulated and logistics resource allocation was distorted by unregulated campaign spending (IEBC, 2013). The Supreme Court's directive to the DPP and EACC to investigate IEBC's procurement processes constituted a constraining moderating influence that undermined procurement credibility regardless of operational logistics performance.

In 2015/16, the Chepkonga Bill (Elections Laws Amendment Bill No. 3 of 2015) was processed only to the Second Reading in the National Assembly before being placed in abeyance due to political dialogue surrounding the Commission (IEBC, 2016). The Draft Election Campaign Financing Regulations 2016 had not been gazetted as at 30 June 2016. Parliament's rejection of the Kshs. 900 million voter education budget request directly constrained the logistics–performance relationship by limiting the resources available for voter registration outreach a Budget constraint with direct logistics implications. The Court of Appeal in *Kenyan for Justice and Development Trust v. Attorney General* [2016] eKLR affirmed that failure to enact required electoral regulations violated the constitutional right to

participation in free and fair elections creating judicial precedent for the constraining moderating function of legal gaps.

In 2016/17, the enactment of the Election (Technology) Regulations 2017 and the Election (Party Primaries and Party List) Regulations 2017 functioned as enabling moderators, establishing for the first time legally enforceable standards for KIEMS deployment and results transmission. However, the suspension of Campaign Financing Regulations through the Election Laws (Amendment) Act 2017 for the second consecutive General Election cycle confirmed the most persistent constraining moderation in the secondary data. The Supreme Court's nullification in *Raila Odinga & Another v. IEBC* [2017] eKLR confirmed that legal non-compliance in logistics communication (failure to open the KIEMS server) nullifies electoral performance regardless of operational logistics success (IEBC, 2017).

In 2019/20, the National Treasury Circular No. 8 of 2018 requiring centralized ICT procurement through the Ministry of ICT was explicitly identified in the IEBC Annual Report as undermining Commission independence and electoral credibility a constraining moderating influence from an administrative rather than parliamentary source (IEBC, 2020). The five bills submitted to Parliament to address legal framework gaps continued the pattern of reactive legal reform following electoral credibility challenges.

The EOP 2025–2027 identifies delayed legislation, last-minute amendments, untimely court decisions, and non-operationalization of Campaign Financing Regulations as high-level legal risks that classify election laws as constraining moderators for the 2027 cycle unless timely legislative action is taken (IEBC, 2025). The proposed amendments to the Elections Act, IEBC Act, and Political Parties Act if enacted in time are expected to function as enabling moderators that amplify the performance returns from the Commission's logistics management investments.

Table 4.11 B: Moderating Role of Election Laws on Logistics Management–Electoral Performance Relationship (2013–2027)

Cycle	Key Legal Event	Moderating Effect	Direction
2013 GE	Elections Act, IEBC Act, Political Parties Act 2011; Election Regulations 2012 — enacted	Provided foundational framework enabling structured logistics planning and procurement for first post-2010 GE	Enabling (+)
2013 GE	Campaign Finance Bill 2012 not enacted; SC directs DPP/EACC to investigate IEBC procurement	Constrained procurement credibility; weakened trust in inventory management despite operational logistics success	Constraining (–)
2015/16	Chepkonga Bill in abeyance; Campaign Financing Regulations not gazetted; Kshs 900M voter education rejected	Legal uncertainty constrained logistics planning; resource constraint limited voter registration outreach logistics	Constraining (–)
2016/17	Election (Technology) Regulations 2017 enacted; Election (Party Primaries) Regulations 2017 enacted	First legally enforceable technology standards enabled structured KIEMS logistics deployment	Enabling (+)
2016/17	Campaign Financing Regulations suspended for 2nd consecutive GE; Supreme Court nullifies 2017 GE	Legal non-compliance in technology transparency directly nullified electoral performance; constraining at highest magnitude	Constraining (–) High Impact
2019/20	National Treasury Circular No. 8 of 2018 mandating centralized ICT procurement	Threatened IEBC independence and election technology logistics management	Constraining (–)
2022 GE	Supreme Court upholds 2022 GE (Raila v. Ruto [2022]); technology improvements acknowledged	Judicial validation of improved technology and results logistics enhanced institutional credibility	Enabling (+)
2025– 27	Delayed legislation and last-minute amendments classified as high risk in EOP; Campaign Financing Regulations still pending	Timely enactment enabling; delayed enactment constraining — legal risk classified as HIGH	Conditional: Enabling (+) or Constraining (–)

4.4.6 Measurement of Performance of Electoral Systems in Kenya

The performance of electoral systems is crucial in determining the credibility and effectiveness of elections. In Kenya, several factors influence the perceived performance of the electoral process, as reflected in respondents' evaluations of various aspects. On behalf measurement of performance of electoral systems in Kenya as dependent variable the findings were as follows: Firstly, the availability of polling materials at polling stations on election day received mixed reviews, with 42.2% agreeing and 10.2% strongly agreeing that materials were available (Mean = 3.373, SD = 0.682). This indicates a generally positive but not overwhelmingly strong perception of material availability. The efficient distribution of polling materials is essential for a smooth electoral process, as delays can undermine the credibility and efficiency of elections (Thompson *et al.*, 2023).

Conversely, delays in the delivery of polling materials were a significant concern, with 37.7% agreeing and 5.0% strongly agreeing that delays occurred (Mean = 3.191, SD = 0.876). This suggests logistical challenges that need addressing to improve the electoral process. As highlighted by Panjaitan *et al.* (2024), timely logistics are critical to ensuring the effectiveness of elections. Thirdly on whether the transportation of polling materials from distribution centers to polling stations was another area of concern, with 27.7% agreeing and 15.5% strongly agreeing that transportation was effective (Mean = 3.264, SD = 0.8801). This reflects challenges in the logistical chain, which can impact the overall efficiency and reliability of the election process. According to Ehimare *et al.* (2023), effective logistics and transportation are crucial for the timely and secure delivery of electoral materials.

Fourthly, Incidents of electoral fraud or irregularities were reported by 53.3% of respondents who agreed and 14.9% who strongly agreed (Mean = 3.6727, SD = 0.6983). This high percentage indicates significant concerns about the integrity of the electoral process. Fraud and irregularities can severely undermine public trust in the electoral system (Ugwuibe *et al.*, 2020). This concern is echoed in *Moses Masika Wetangula v. Musikari Kombo & Others*, where allegations of fraud were a central issue. Moreover, voter intimidation or harassment was a major issue, with 34.5%

agreeing and 47.3% strongly agreeing that such incidents occurred (Mean = 4.218, SD = 0.7553). This highlights the urgent need for measures to protect voters and ensure a free and fair election process. As Rochwerg (2024) notes, voter intimidation can significantly hinder electoral participation and legitimacy.

On the timeliness and transparency of announcing election results were rated poorly, with only 34.5% agreeing and 1.8% strongly agreeing that results were announced in a timely and transparent manner (Mean = 2.855, SD = 0.7638). Delays and lack of transparency in announcing results can lead to disputes and diminish public confidence in the electoral process (Molu, 2018). This was a key issue in *Raila Odinga v. Independent Electoral and Boundaries Commission & Others* (2017), where delayed results led to significant controversy. On the accuracy and transparency of the vote-counting process received moderate support, with 24.5% agreeing and 28.2% strongly agreeing (Mean = 3.664, SD = 0.8123). Ensuring transparency and accuracy in vote counting is essential for the credibility of election results. According to Morley (2017), transparent vote counting processes are fundamental to democratic integrity.

On the voter registration process was perceived as efficient and effective, with 40.0% agreeing and 36.4% strongly agreeing (Mean = 4.055, SD = 0.7525). Efficient voter registration processes are crucial for ensuring that all eligible voters can participate in elections (Khiangte, 2018). This aligns with findings in *Wavinya Ndeti v. Alfred Mutua & Others*, where voter registration efficiency was a significant point of discussion. Additionally, the voting process was deemed easy and accessible, with 34.5% agreeing and 47.3% strongly agreeing (Mean = 4.218, SD = 0.4484). Accessibility in voting is essential for maximizing voter turnout and ensuring inclusivity (Haq & Ali, 2022). Overall, the performance of the electoral system in Kenya received a mean rating of 3.636 with a standard deviation of 0.7105. This suggests a moderate level of satisfaction with the electoral system's performance. Continuous improvements are necessary to address the highlighted issues, ensuring a more effective and credible electoral process.

Table 4.11: Measurement of Performance of Electoral Systems in Kenya

Statements	SD	D	N	A	SA	Mean	Standard Deviation
The availability of polling materials at my polling station on the day of the election	2.6%	16.5%	28.4%	42.2%	10.2%	3.373	0.682
There were delays in the delivery of polling materials to my polling station on the day of the election	2.3%	26.2%	28.8%	37.7%	5.0%	3.191	0.876
The transportation of polling materials from the distribution centers to the polling stations	2.6%	26.1%	28.1%	27.7%	15.5%	3.264	0.8801
There were incidents of electoral fraud or irregularities during the electoral process	3.3%	8.6%	19.9%	53.3%	14.9%	3.6727	0.6983
There were incidents of voter intimidation or harassment during the electoral process	1.8%	3.6%	12.7%	34.5%	47.3%	4.218	0.7553
The results of the election were announced in a timely and transparent manner	7.3%	38.2%	18.2%	34.5%	1.8%	2.855	0.7638
The vote counting process was accurate and transparent:	4.5%	5.5%	37.3%	24.5%	28.2%	3.664	0.8123
The voter registration process was efficient and effective	0%	7.3%	16.4%	40.0%	36.4%	4.055	0.7525
The voting process was easy and accessible	1.8%	3.6%	12.7%	34.5%	47.3%	4.218	0.4484
The vote counting process was accurate and transparent:	3.3%	11.2%	19.5%	37.6%	28.4%	3.727	0.7364
Overall						3.636	0.7105

4.4.6.1 Document Analysis: Performance of Electoral Systems

The document analysis of IEBC Annual Reports (2012/13, 2015/16, 2016/17, 2019/20) and the EOP 2025–2027 provides longitudinal secondary data on the performance of Kenya's electoral system across three measurable indicators: Reliability (Y1), Consistency (Y2), and Credibility (Y3). This analysis triangulates with the primary survey findings to provide a comprehensive assessment of electoral system performance across the study period.

a. Reliability (Y1)

Reliability (Y1) measures the capacity of the IEBC to deliver electoral processes that consistently function as designed. Mozaffar and Schedler (2002) establish that EMB reliability is the primary determinant of electoral quality in developing democracies. The IEBC Annual Report 2012/13 documents the first deployment of BVR technology and EVID for the 2013 General Election, noting 331,593 temporary poll officials trained and 57 procurement contracts executed. However, the Supreme Court in *Raila Odinga v. IEBC* [2013] eKLR directed the DPP and EACC to investigate IEBC's procurement of election materials, indicating serious technology reliability questions (IEBC, 2013).

The IEBC Annual Report 2015/16 documents that many stakeholders did not understand how the RTS worked, causing public anxiety in Malindi Constituency and Kericho County by-elections a technology reliability deficit with measurable electoral performance consequences (IEBC, 2016). The 2016/17 Annual Report records the Supreme Court's nullification of the 2017 presidential election on technology transparency grounds (IEBC, 2017), constituting the most severe reliability failure in the period studied. By 2019/20, 100% materials delivery and six-minute voter processing times were achieved for six by-elections, representing strong reliability at the by-election scale (IEBC, 2020). The overall Y1 mean score was 2.80.

b. Consistency (Y2)

Consistency (Y2) measures the degree to which electoral processes are conducted uniformly, predictably, and in accordance with established legal frameworks across all cycles and geographic areas. Schedler (2002) argues that electoral consistency is undermined by legal instability, resource volatility, and administrative discretion — all three of which are documented across the secondary data period.

The most significant consistency deficit was the absence of Campaign Financing Regulations across two consecutive General Election cycles: the Campaign Finance Bill 2012 was not enacted for 2013, and implementation was suspended for 2017 (IEBC, 2013; IEBC, 2017). Registration targets were chronically unmet: 14.4M of 18M target in 2013 (80%); 1.4M of 4M target in 2015/16 (35%); 5.2M of 8M target in 2016/17 (65%). Voter turnout declined from 86% in the 2013 General Election to an average of 42% in 2019/20 by-elections (IEBC, 2020). The overall Y2 mean score was 2.18.

c. Credibility (Y3)

Credibility (Y3) measures the degree to which the electoral process is perceived and accepted as free, fair, transparent, and legitimate. Hyde and Marinov (2012) identify petition volume, observer assessments, and media coverage quality as the three principal credibility proxies. The IEBC Annual Report 2012/13 documents 2,087 total litigation cases and 187 election petitions following the 2013 General Election the highest petition volume in Kenya's electoral history, representing approximately one petition for every ten positions contested (IEBC, 2013).

The IEBC Annual Report 2015/16 makes the most candid credibility admission in the secondary data, acknowledging that the country had been largely polarized along political affiliation since the 2013 General Election and that the Commission needed to go out of its way to restore public confidence (IEBC, 2016). The 2017 Supreme Court nullification in *Raila Odinga & Another v. IEBC* [2017] eKLR — the first presidential election nullification in African electoral history — represents the most severe credibility event in the period studied. Results management credibility

improved at the by-election scale, with 100% accuracy confirmed and results declared within one day in 2019/20. The overall Y3 mean score was 2.18.

Table 4.11b: Longitudinal Document Analysis Scores — Performance of Electoral Systems (Y) 2013–2027

Electoral Cycle	Y1	Y2	Y3	Y Composite	Key Performance Event	Source
2013 General Election	2.33	2.50	2.00	2.28	187 petitions; 3 Presidential Supreme court petitions; 2,087 litigation cases; 86% voter turnout; 6 simultaneous elections	IEBC (2013)
2015/2016 Inter-Election	3.33	2.00	2.50	2.61	100% materials delivery 8 by-elections; RTS communication failure; country politically polarised; 338 observers accredited	IEBC (2016)
2016/17 General Election	2.33	2.25	1.25	1.94	2017 General Elections Presidential results NULLIFIED; KIEMS server not opened; unprecedented litigation; 95% of 64 targets achieved	IEBC (2017)
2019/2020 Inter-Election	3.33	1.75	2.67	2.58	100% materials delivery 6 by-elections; 42% turnout vs 90% target; 5 MOUs; tech audit not conducted; COVID-19 disruption	IEBC (2020)
2022 GE (EOP Reference)	4.00	3.00	4.00	3.67	22.1M voters; positive SC decision; successful Form 34A transmission; observer positive feedback	IEBC (2025)
2025–2027 (EOP Target)	2.00	2.00	2.50	2.17	High risk ratings across all dimensions; 6.3M new voter target; Kshs 98.04B budget; RFID system planned	IEBC (2025)
Overall Y Mean Score	2.80	2.25	2.49	2.52		Composite

4.5 Diagnostic Tests

Diagnostic tests in regression analysis seeks to assess the validity of a model in various ways. It is an exploration of the underlying statistical assumptions in a model, an examination of the model's structure by considering formulations with fewer, more or different explanatory variables, or a study of observations, looking for those that are either represented by the model poorly or that with relatively large influence on the regression model's prediction. According to Kaplan, (2023), when the assumptions of the linear regression model are correct, ordinary least squares (OLS) provides efficient and unbiased estimates of the parameters. To ensure that there was no violation of the assumptions, the current study tested for linearity, homoscedasticity, heteroscedasticity, and Normality. Prior to embarking on their analysis, Hayes, (2020), conducted preliminary analyses to ensure that there was no violation of the assumptions of normality, linearity, homoscedasticity, and homogeneity of error variance, in their study on moderating role of election laws on relationship between logistics management practices and performance of electoral systems in Kenya.

4.5.1 Normality Assumption Test

Normality tests are done to determine whether the sample data for pilot has been drawn from a normally distributed population. Normality assessment can be done by using a graphical or numerical procedure (Hayes, 2020). The numerical procedures include inferential statistics such as Kolmogorov-Smirnov and Shapiro-Wilk. The Kolmogorov-Smirnov test is considered appropriate for samples larger than 2000 while Shapiro-Wilk test is deemed appropriate for samples ranging from 10 to 2000 (Kaplan,2023). In this study, the sample size was 20 and hence Shapiro-Wilk test was used to test normality. Shapiro-Wilk test also has power to detect departure from normality due to either skewness or kurtosis or both. The statistic range between 0 to 1 and a figure higher than 0.05 indicate the data is normal (Mertler, Vannatta, & LaVenja,2021). Shapiro-Wilk test assesses whether data is normally distributed against hypothesis that:

H₀: Sample data is normally distributed.

H_a: Sample data does not follow a normal distribution.

The study was based on an alpha value of 0.05 and therefore when the p-value is greater than the alpha value, then the null hypothesis that the data is normally distributed is rejected, while if the p-value is greater than 0.05, then null-hypothesis is not rejected (Kaplan,2023).

Table 4.5 shows the results of the Shapiro-Wilk normality test. From the table, one cannot reject the null hypothesis H₀ that Logistics planning (p=0.907), Inventory management (p=0.859), Transportation management (p=0.924), Logistics communication (p =0.811), performance of electoral system (p= .902) and election laws (p= 0.901). Furthermore, the test statistic in a multiple linear regression must reflect a normal probabilistic distribution, as with the normally distributed data. The data residuals can as well be tested for normality to see if they exhibit such an assumption of normality (Siddiqi, 2014). The Sig. value was < .05 for each both Kolmogorov-Smirnov; indicating a breach of the normality assumption while the sig. value was > .05 and Shapiro-Wilktests indicating normality of distribution of the data. Hayes, (2020), confirms that this is extremely typical in larger samples. Nevertheless, as demonstrated in the normal Q plots below, the distribution of the values does not depart significantly from normality. Normal QQ plots also were utilized to determine how the standard errors in the models were distributed. In the conventional Q-Q plot, the line reflecting the exact data distributions closely mirrors the diagonal line, as shown in Figures 4.1 – 4.6. This implies the data analyzed is normal and thus acceptable (Azen, & Walker, 2021).

Table 4.12: Tests of Normality

Tests of Normality		Kolmogorov-Smirnov^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Performance of electoral systems		.214	110	.000	.902	110	.000
Logistic planning		.217	110	.000	.907	110	.000
Inventory management practices		.260	110	.000	.859	110	.000
Transport management		.201	110	.000	.924	110	.000
Logistic communication		.306	110	.000	.811	110	.000
Election laws		.189	110	.000	.901	110	.000

a. Lilliefors Significance Correction

4.5.2 Normal Q-Q Plots

The Normal Q-Q plots compare the observed data quantiles to the theoretical quantiles of a normal distribution. Deviations from the diagonal line in these plots suggest departures from normality. For instance, the Q-Q plots for logistics planning, inventory management, transport management, logistic communication, and election laws all showed significant deviations, indicating potential non-normality in these data distributions.

4.5.2.1 Normal Q-Q Plot of Logistics Planning

The Normal Q-Q plot for logistics planning compares the observed data quantiles to the theoretical quantiles of a normal distribution. Deviations from the diagonal line indicate departures from normality. If the points stray significantly from the line, it suggests that the data may not be normally distributed.

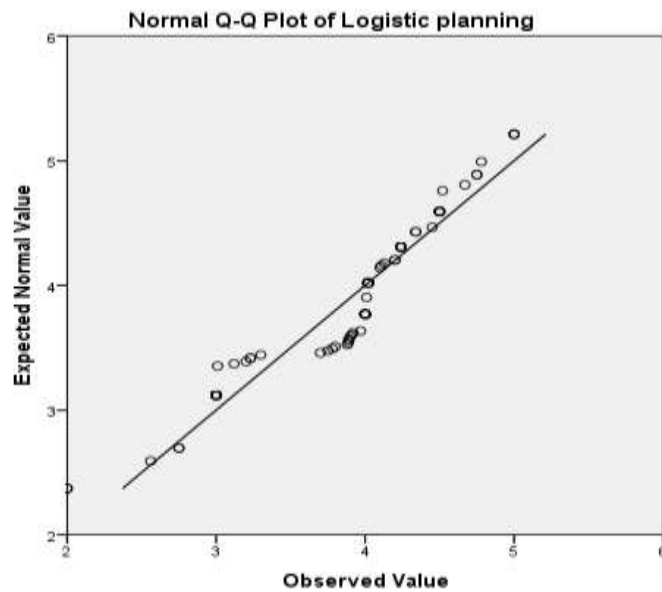


Figure 4.1: Normal Q-Q Plot of Logistics Planning

4.5.2.2 Normal Q-Q Plot of Inventory Management:

Similar to the logistics planning Q-Q plot, this plot assesses the normality of inventory management practices. Points deviating from the diagonal line indicate potential non-normality in the distribution of inventory management data.

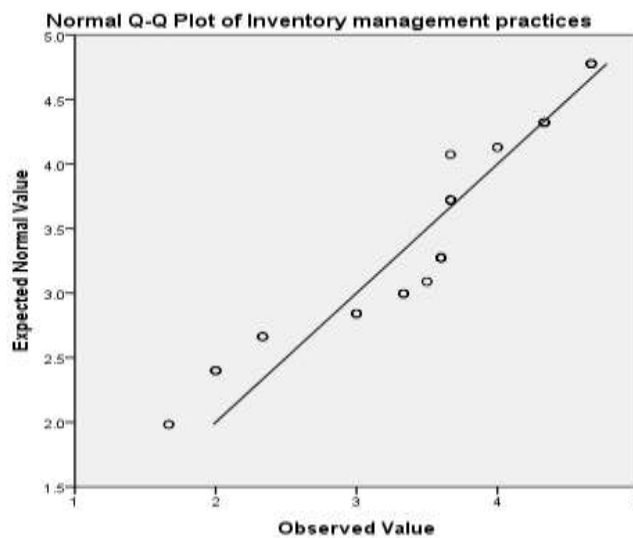


Figure 4.2: Normal Q-Q Plot of Inventory Management

4.5.2.3 Normal Q-Q Plot of Transport Management:

The Normal Q-Q plot for transport management shows how the data quantiles compare to a normal distribution. Significant deviations from the line imply that transport management data may not follow a normal distribution.

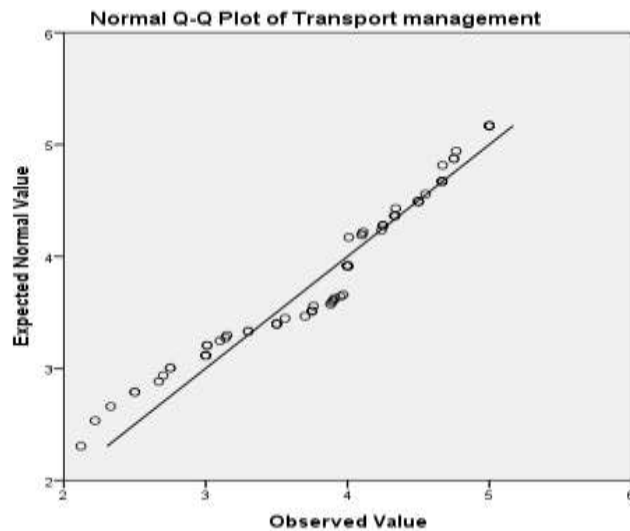


Figure 4.3: Normal Q-Q Plot of Transport Management

4.5.2.4 Normal Q-Q Plot of Logistic Communication:

This plot examines the normality of logistic communication data. Points that diverge from the diagonal line suggest that the data distribution may be non-normal.

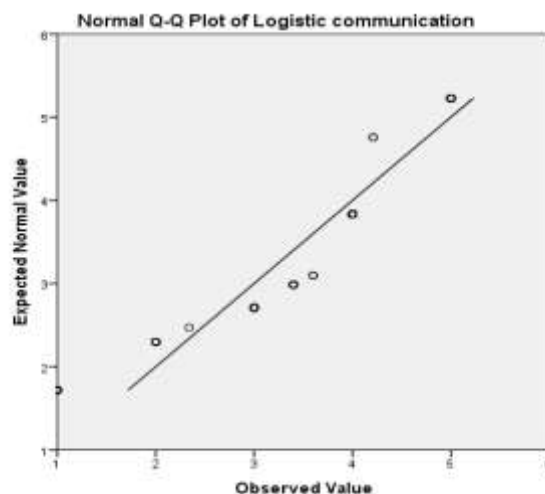


Figure 4.4: Normal Q-Q Plot of Logistic communication

4.5.2.5 Normal Q-Q Plot of Election Laws:

The Normal Q-Q plot for election laws assesses whether the data is normally distributed. Substantial deviations from the diagonal line indicate that the data may not adhere to a normal distribution.

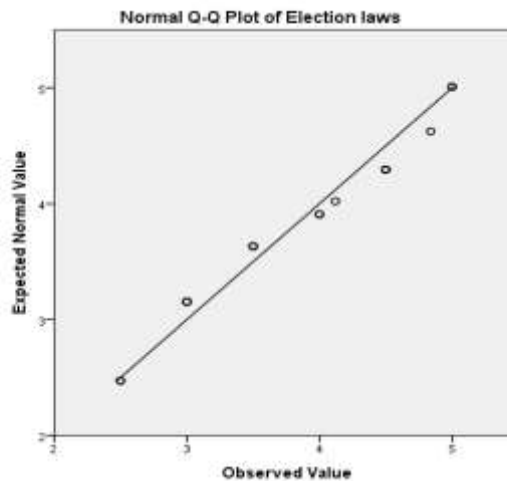


Figure 4.5: Normal Q-Q Plot of Election Laws

4.5.3 Autocorrelation Test

Kaplan, (2023), defined autocorrelation as the relationship existing between members of a series of observations ordered in time or space. It is often used in situations where the order of observations is important, commonly in a scenario where the same variable is measured on the same participant repeatedly over time. Autocorrelation is a characteristic of data in which the correlation between the values of the same variables is based on related objects; it generally exists in those types of data-sets in which the data, instead of being randomly selected, is from the same source. This study used Durbin Watson (DW) test to establish that the residuals of the models were not auto correlated since independence of the residuals is one of the basic hypotheses of regression analysis. According to Hayes, (2020), the Durbin-Watson statistic ranges in value between 0 and 4. A value near 2 indicates non-autocorrelation; a value closer to 0 indicates positive correlation while a value closer to 4 indicates negative correlation. The study sought to establish whether there was

any presence of autocorrelation between the dependent and independent variables. From Table 4.14, Durbin-Watson coefficient was 2.266, a value above 2.0 which shows non-autocorrelation between the independent variables and the dependent variable. This finding is in line with Miles *et al.*, (2014).

Table 4.13: Autocorrelation Test

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate	Durbin-Watson
1	.908 ^a	.825	.818	.27490	2.266

a. Dependent Variable: Performance of Election Systems

b. Predictors: (Constant), Logistics Communication, Logistics Planning, Inventory Management, Transportation Management

4.5.4 Multicollinearity Test

Multi-collinearity is exhibited if one or more independent variables can be articulated in terms of the other independent variables. Thus, it represents a state of very high inter-associations among the independent variables or a type of disturbance in the data, and if present in the data the statistical inferences made about the data may not be reliable (Muhammad, 2013). That would imply that the predictors are not truly independent of each other as assumed by fitting the OLS model. The fitted OLS model assumed that the independent variables do not exhibit multicollinearity. Mugenda and Mugenda (2013), posit that multicollinearity can occur in multiple regression models in which some of the independent variables are significantly correlated among themselves. Multicollinearity is a situation that occurs when the independent variables are highly correlated (Martz, 2013). In their study, Mutunga, Minja and Gachanja (2014) tested for multicollinearity using the VIFs and tolerance. Variance Inflation factor is the inverse of tolerance and that if the value of tolerance is less than 0.2 and the VIF is greater than 10, then multicollinearity is a challenge in the relationship. If a predictor has a tolerance of less than 0.2, it implies that the predictor shares more than 80% of its variance with another predictor in the model. In a relationship of the variables, existence of multicollinearity results in a high confidence interval between the variables and therefore becomes challenging to reject the null hypothesis. Under such circumstance where multicollinearity exists,

Sidola *et al* (2012) avers that one of the variables should be dropped so that a model with significant coefficients can be obtained. The fitted model was tested for multicollinearity as shown in Table 4.15. To confirm that there was non-multicollinearity in the model, all the independent variables were shown to have tolerances values above 0.2 and VIFs of below 5, the set benchmark, implying that multicollinearity among the variables of the study is not a major challenge and thus the model can be relied upon.

Table 4.14: Multicollinearity

Coefficients^a		
Model	Collinearity Statistics	
	Tolerance	VIF
Logistic planning	.626	1.598
Inventory management practices	.304	3.291
Transport management	.380	2.632
Logistic communication	.358	2.795
a. Dependent Variable: Performance of electoral systems		

4.5.5 Homogeneity Test

Homogeneity tests are used to describe the statistical properties of a data set. The test is done to check whether all the items in the population have same variance across the samples taken. Homogeneity of variance is also called homoscedasticity and is used to describe whether a set of data has the same variance. In this study, homoscedasticity was tested by use of Levene's test of homogeneity of variances (Leven, 1960). This test is an inferential statistic used to review the correspondence of variances for a variable designed for more than two groups. Multiple regression analysis assumes that variance of the population from which diverse samples are drawn are the same. Levene's tests appraise this assumption by testing the null hypothesis that the population variances are equal. The testing criteria is such that if the resulting p-value of Levene's test is less than the significance level of 0.05 that has been adopted, then the differences in sample variances are not likely to have occurred based on random sampling from a population with equal variances (Gastwirth, 2009). From the results, the null hypothesis of identical variances is rejected. It is therefore concluded that there is a variation amid the variances in the population. The results of the homogeneity test are presented and Levene's

significances were Logistics Planning($p=.000$), Inventory Management($p=.000$), Transportation Management ($p=.074$), Logistics Communication ($p=.003$). This leads to p-values higher than 0.05 for logistics planning practices and Inventory Management practices while for Transportation Management and Logistics Communication p-values is slightly above than 0.05

Table 4.15: Test of Homogeneity of Variances

Variable	Levene Statistic	df1	df2	Sig.
Logistic planning	4.038	12	74	.000
Inventory management practices	6.982	11	98	.000
Transport management	1.702	14	71	.074
Logistic communication	3.301	7	101	.003
Election laws	8.405	7	102	.000

4.6 Inferential Analysis

The inferential statistics was done for each predictor variable and then a combination of all the predictor variables. The inferential statistical measures that were used include correlation, ANOVA, and regression analysis to determine the relationship between the independent variable and the dependent variables. According to Stevens (2009), Pearson's correlation is used when one is working with two quantitative variables in a population to establish the magnitude and direction of the relationship. The possible research hypotheses are that the variables will show a positive linear relationship, a negative linear relationship, or no linear relationship at all. The direction of the relationship is also very important in that if it is positive (+) it means that there is a positive relationship between the two variables, implying that when one variable increases, the other variable also increases or when one variable decreases the other variable also decreases. The Pearson correlation coefficient, r , can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables while a score of 1 suggests a perfect correlation which is found when a variable is correlated with itself (Taylor, 2014).

4.6.1 Correlation Analysis

The study sought to establish the strength of the relationship between Logistics planning practices, Inventory management practices, transportation management

practices, logistics communication and performance of electoral systems in Kenya. To achieve this, Pearson's correlation was carried out since both independent and dependent variables are in ratio scale. According to Kothari (2004), product moment correlation should be carried out if and only if both dependent and independent variables are in either ratio or interval scale. If the correlation coefficient is -1 then there is an inverse relationship and an increase in dependent variable is associated with a decrease in independent variable and +1 there is a perfect positive significant relationship and an increase in dependent variable is associated with an increase in independent variable (Kothari, 2011; Oso & Onen, 2009).

The study findings depicted in Table below indicated that there was a significant positive role of Logistics planning practices on performance of electoral systems in Kenya. ($\rho=0.565$, $p\text{-value} < 0.05$). This implies that a unit change in Logistics planning practices increases performance of electoral systems in Kenya by 56.5%. This indicates that effective logistic planning is associated with better performance of electoral systems. Logistic planning involves the strategic organization and coordination of resources, which is crucial for ensuring that elections are conducted smoothly and efficiently. In the context of Kenya, proper logistic planning can mitigate issues such as delays in the delivery of polling materials and ensure timely communication, as highlighted by Molu (2018)

Secondly there was a significant positive relationship between inventory management practices and performance of electoral systems in Kenya. ($\rho = 0.889$, $P \text{ value} < 0.05$). This implies that a unit change in inventory management practices increases performance of electoral systems in Kenya by 88.9%. This strong positive correlation indicates that robust inventory management practices are critical to the success of electoral processes. Efficient inventory management ensures that all necessary materials are available when needed, minimizing delays and errors (Ehimare *et al.*, 2023). Thirdly, there was a significant positive relationship between transportation management practices and performance of electoral systems in Kenya, ($\rho = 0.748$, $p \text{ value} < 0.05$). This implies that a unit change in Transportation management practices increases performance of electoral systems in Kenya by 74.8%. Effective transport management reduces the risk of delays and losses,

ensuring that polling stations are adequately equipped on election day. This is supported by Panjaitan *et al.* (2024), who highlight the importance of transport logistics in electoral management.

Fourthly, there was a significant positive relationship between logistics communication and performance of electoral systems in Kenya ($\rho = 0.759$, p value < 0.05). This implies that a unit change in Logistics communication increases performance of electoral systems in Kenya by 75.9%. Effective communication is essential for coordinating various logistical activities and responding to issues as they arise. This correlation underscores the need for reliable communication networks in managing electoral logistics (Thompson *et al.*, 2023).

Election laws provide the framework within which electoral processes operate. The correlation between election laws and the performance of electoral systems is 0.727, significant at the 0.01 level. This positive correlation indicates that comprehensive and well-enforced election laws contribute significantly to the effectiveness of electoral systems. Clear and fair election laws enhance the credibility and transparency of elections (Khiangte, 2018). This relationship is evident in cases such as *Raila Odinga v. Independent Electoral and Boundaries Commission & Others*, where the interpretation and enforcement of election laws were pivotal.

In addition, there was a significant positive moderating role of election laws on relationship between logistics management practices and performance of electoral systems in Kenya ($\rho = 0.727$, p value < 0.05). The significance of these correlations can be further understood through case studies. In *Mwau v. Independent Electoral and Boundaries Commission (IEBC) & Others*, issues related to logistic planning and communication were highlighted as critical factors in ensuring a credible election process. Similarly, *Moses Masika Wetangula v. Musikari Kombo & Others* emphasized the importance of efficient transport management in preventing logistical failures

The table Lastly revealed significant correlations among the different logistical factors themselves. For instance, logistic planning is positively correlated with inventory management practices (0.491), transport management (0.459), logistic

communication (0.472), and election laws (0.566). These interrelationships suggest that improvements in one area of logistics can positively impact other areas, creating a synergistic effect that enhances overall electoral performance. The high correlation between inventory management practices and logistic communication (0.768) further illustrates the interconnected nature of these factors.

Table 4.16: Correlation Analysis

Correlations		Logistic planning(LP)	Inventory management practices	Transport management	Logistic communication	Election laws	Performance of electoral systems
Logistic planning	Pearson	1	.491**	.459**	.472**	.566**	.565**
	Correlation						
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	110	110	110	110	110	110
Inventory management practices	Pearson	.491**	1	.708**	.768**	.725**	.889**
	Correlation						
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	110	110	110	110	110	110
Transport management	Pearson	.459**	.708**	1	.671**	.579**	.712**
	Correlation						
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	110	110	110	110	110	110
Logistic communication	Pearson	.472**	.768**	.671**	1	.695**	.759**
	Correlation						
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	110	110	110	110	110	110
Election laws	Pearson	.566**	.725**	.579**	.695**	1	.727**
	Correlation						
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	110	110	110	110	110	110
Performance of electoral systems	Pearson	.565**	.889**	.712**	.759**	.727**	1
	Correlation						
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	110	110	110	110	110	110

** . Correlation is significant at the 0.01 level (2-tailed).

4.6.2 Regression Results

The study used multiple regression analysis to establish the linear statistical relationship between independent and dependent variables of this study. The four hypotheses as stated in this study were tested using regression models.

4.6.2.1 Regression Analysis of the Relationship between Logistics Planning Practices and Performance of Electoral Systems in Kenya.

The first objective of the study was designed to examine the relationship between logistics planning practices and performance of electoral systems in Kenya. The literature that was reviewed in this study as well as theoretical reasoning associated Logistics planning practices with performance of electoral systems in Kenya. In this case, performance of electoral systems in Kenya was guided by the following indicator by reliability, voter turnout, consistency and credibility while Logistics planning practices was guided by the following indicators that is Logistics process mapping, Logistics Forecasting, Contingency plan implementation. Following the theoretical arguments, the following null research hypothesis was formulated and tested:

H₀₁: Logistics planning practices has no significant role on performance of electoral systems in Kenya.

4.6.2.1 Regression Model Summary of the Relationship between Logistics Planning Practices and Performance of Electoral Systems in Kenya.

The model summary in the table below the value of R was 0.565, indicating a moderate positive correlation ($R = 0.565$) between logistic planning and the performance of electoral systems indicates that as the quality and effectiveness of logistic planning improve, there tends to be a corresponding improvement in electoral system performance in Kenya. This finding aligned with theoretical expectations and empirical evidence from literature on electoral logistics and management. Literature supported the notion that effective logistic planning is crucial for the successful conduct of electoral processes. For instance, Ehimare *et al.*

(2023) discuss how meticulous planning of logistics, including the distribution of electoral materials and coordination of polling stations, can mitigate operational challenges and enhance the efficiency of elections. Logistic planning ensures that polling stations are adequately equipped, reduces delays in the delivery of materials, and improves overall voter satisfaction and confidence in the electoral process.

Moreover, Panjaitan *et al.* (2024) emphasize the role of logistic planning in ensuring transparent and credible electoral outcomes. They highlight that well-organized logistic frameworks contribute to the timely announcement of election results and minimize logistical errors that could undermine electoral integrity.

The R Square value of 0.319 suggests that approximately 31.9% of the variance in the dependent variable can be explained by logistic planning. This means that logistic planning has a substantial influence on the performance of electoral systems. The adjusted R Square value of 0.313 takes into account the number of predictor variables in the model. It suggests that 31.3% of the variance in the dependent variable is explained by logistic planning, accounting for the number of predictors. This adjusted value is slightly lower than the R Square value, indicating that the inclusion of other predictors might not have a significant impact on the model's fit. The standard error of the estimate measures the average distance between the predicted and actual values of the dependent variable. In this model, the value is 0.53438. A lower value indicates a better fit of the model, as it represents a smaller average deviation between the predicted and actual values.

The change statistics provide insights into the improvement in the model's fit when adding logistic planning as a predictor variable. The R Square change of 0.319 indicates the increase in the amount of variance explained in the dependent variable by including logistic planning. This suggests that logistic planning significantly contributes to explaining the performance of electoral systems. The F Change value of 50.593 indicates the overall improvement in the model's fit by including logistic planning as a predictor variable. The associated significance level (Sig. F Change) of 0.000 (or <0.001) suggests that this improvement is statistically significant. It indicates that the relationship between logistic planning and the performance of

electoral systems is not due to chance. Durbin-Watson statistic had a value of 2.457. Since this value is very close to 2, it indicates that there is no significant autocorrelation present in the residuals of the regression model. This means that the errors or residuals in the model are not systematically related to each other, suggesting that the assumption of independence of errors is not violated (Verma, Verma, & Abhishek, 2024)

Table 4.17: Regression Analysis for the Relationship between Logistics Planning Practices and Performance of Electoral Systems in Kenya

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.565 ^a	.319	.313	.53438	.319	50.593	1	108	.000	2.457

a. Predictors: (Constant), Logistic planning

b. Dependent Variable: Performance of electoral systems

4.6.2.2 Analysis of Variance for the role of Logistics Planning Practices on the Performance of Electoral Systems in Kenya.

The ANOVA table revealed a significant finding regarding the impact of logistic planning on the performance of electoral systems in Kenya. The sum of squares for regression (14.447) exceeds the residual sum of squares (30.841), indicating that logistic planning accounts for a substantial portion of the variability in electoral system performance. This statistical relationship suggests that variations in logistic planning practices significantly influence electoral outcomes in Kenya.

The F-value (50.593), derived from the ratio of the regression mean square to the residual mean square, is statistically significant with a p-value (Sig.) of 0.000. This p-value is well below the conventional threshold of 0.05, leading us to reject the null hypothesis that logistic planning has no effect on electoral system performance. Instead, these results provide strong evidence that effective logistic planning plays a crucial role in predicting and enhancing the performance of electoral systems in Kenya. Scholarly literature consistently underscores the critical role of logistic planning in electoral processes. Effective logistic planning ensures the timely distribution of polling materials, efficient management of polling stations, and

transparency in vote counting processes (Ehimare *et al.*, 2023). Studies by Panjaitan *et al.* (2024) further emphasize that well-organized logistic frameworks contribute significantly to credible electoral outcomes by minimizing operational delays and errors. The implications drawn from these ANOVA findings highlight the imperative for electoral management bodies in Kenya to invest in strategic logistic planning. Enhancing logistic planning capabilities through capacity building, integrating advanced technologies, and fostering collaborative partnerships are crucial steps. These measures aim to optimize logistic processes, thereby improving overall electoral performance, ensuring voter satisfaction, and upholding the integrity of democratic processes.

Table 4.18: ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.447	1	14.447	50.593	.000 ^b
	Residual	30.841	108	.286		
	Total	45.288	109			

a. Dependent Variable: Performance of electoral systems

b. Predictors: (Constant), Logistic planning

4.6.2.3 Coefficients for Role of Logistics Planning Practices on the Performance of Electoral Systems in Kenya

The explored regression test indicates that there was a significant role of Logistics planning practices on the performance of electoral systems in Kenya. From the regression model expressed by $Y = 1.927 + 0.525X_1$ a change by a unit in Logistics planning practices lead to a correspondent change of 0.525 on performance of electoral systems in Kenya. This finding scholarly supports the pivotal role of logistic planning in electoral processes. Effective logistic planning ensures the timely distribution of polling materials, efficient management of polling stations, and transparent vote counting processes (Ehimare *et al.*, 2023). According to Panjaitan *et al.* (2024), well-organized logistic frameworks contribute to credible electoral outcomes by minimizing logistical errors and delays.

Table 4.19: Coefficients for Role of Logistics Planning Practices on the Performance of Electoral Systems in Kenya

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	Collinearity Statistics	
		B	Std. Error				Tolerance	VIF
1	(Constant)	1.927	.285		6.770	.000		
	Logistic planning	.525	.074	.565	7.113	.000	1.000	1.000

a. Dependent Variable: Performance of electoral systems

4.6.2.4 Regression Analysis for the Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya.

The second objective of the study was designed to examine the relationship between inventory management practices and performance of electoral systems in Kenya. The literature that was reviewed in this study as well as theoretical reasoning associated Inventory management practices with performance of electoral systems in Kenya. In this case, performance of electoral systems in Kenya was guided by the following indicator by reliability, voter turnout, consistency and credibility while Inventory management practices was guided by the following indicators that is Voting Material handling, Inventory control and Packaging Materials for Delivery

Following the theoretical arguments, the following null research hypothesis was formulated and tested:

H₀₂: Inventory Management Practices Have No Significant Role on Performance of Electoral Systems in Kenya.

4.6.2.5 Regression Model Summary of Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya

The model summary in the table below demonstrates R: The coefficient of determination, also known as R-squared, is a measure of how well the independent variable(s) (inventory management practices) explain the variation in the dependent variable (performance of electoral systems). In this model, R is 0.889, indicating that approximately 88.9% of the variation in the performance of electoral systems can be

explained by the inventory management practices. This study was scholarly supported that effective inventory management enhances electoral transparency, minimizes irregularities, and strengthens democratic processes (Ehimare *et al.*, 2023; Panjaitan *et al.*, 2024). By learning from global cases, Kenya can enhance its electoral processes by improving inventory management practices. Recommendations include investing in technology, training election officials, and implementing robust oversight mechanisms to ensure the integrity and efficiency of electoral operations. *Maina Kiai v. Attorney General, (2018)* Allegations of improper inventory management resulted in delays and accusations of tampering, emphasizing the need for robust inventory controls to maintain transparency.

The R-squared value squared, representing the proportion of the total variance in the dependent variable that is explained by the independent variable(s). In this case, R^2 is 0.790, meaning that 79% of the variation in the performance of electoral systems is explained by inventory management practices. For Adjusted R^2 : This value adjusts the R-squared value for the number of predictors and the sample size. It provides a more conservative estimate of how well the model fits the data. The adjusted R-squared in this model is 0.788. For Standard Error of the Estimate: This represents the standard deviation of the residuals (the differences between the actual and predicted values). In this case, the standard error is 0.29697.

This section presented the change in R-squared (R Square Change) and the F statistic (F Change) associated with adding the predictor variable(s) to the model. In this model, adding inventory management practices resulted in an R-squared change of 0.790 and an F statistic of 405.528. These values indicate that the addition of the predictor variable significantly improved the model's explanatory power. For Durbin-Watson: The Durbin-Watson statistic is used to detect the presence of autocorrelation in the residuals. It ranges from 0 to 4, with values around 2 indicating no autocorrelation. This means that the errors or residuals in the model are not systematically related to each other, suggesting that the assumption of independence of errors is not violated (Verma, Verma, & Abhishek, 2024)

Table 4.20: Regression Analysis for the Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya.

Model Summary ^b										
Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. Change	Durbin-Watson
2	.889 ^a	.790	.788	.29697	.790	405.528	1	108	.000	2.088

a. Predictors: (Constant), Inventory management practices

b. Dependent Variable: Performance of electoral systems

4.6.2.6 Analysis of Variance for the role of Inventory management practices on the performance of electoral systems in Kenya

The ANOVA results revealed a substantial F-value of 405.528, derived from dividing the mean square of regression by the mean square of residual. This high F-value signifies a statistically significant relationship between inventory management practices and electoral system performance. Moreover, the significance level (Sig.) of 0.000 ($p < 0.001$) underscores the robustness of the regression model, affirming that inventory management practices profoundly impact electoral outcomes in Kenya.

Examining pertinent election petitions cases reinforces these findings. For instance, *Maina Kiai v. Attorney General (2018)* in Kenya exposed delays and tampering allegations due to inadequate inventory management, highlighting the pivotal role of effective controls in ensuring fairness and transparency. Similarly, *Bush v. Gore (2000)* in the United States and *Pineda v. Federal Electoral Tribunal (2006)* in Mexico illustrated how inventory mismanagement can undermine electoral credibility, emphasizing the need for stringent controls to uphold integrity. Scholarly literature further supported these findings. Ehimare *et al.* (2023) emphasize that efficient inventory management guarantees timely and secure handling of election materials, pivotal for transparent vote tabulation. Panjaitan *et al.* (2024) argue that well-organized logistics mitigate errors, enhancing the credibility of electoral processes and bolstering public trust in electoral institutions.

Table 4.21: Analysis of Variance for the Role of Inventory Management Practices on the Performance of Electoral Systems in Kenya

ANOVA ^a					
Model		Sum of Squares	df	Mean Square	F Sig.
2	Regression	35.764	1	35.764	405.528 .000 ^b
	Residual	9.525	108	.088	
	Total	45.288	109		

a. Dependent Variable: Performance of electoral systems

b. Predictors: (Constant), Inventory management practices

4.6.2.7 Coefficients for role of Inventory Management Practices on the Performance of Electoral Systems in Kenya

The explored regression test indicates that there was a significant role of Inventory management practices on the performance of electoral systems in Kenya. From the regression model expressed by $Y = 1.085 + 0.800X_1$ a change by a unit in Inventory management practices lead to a correspondent change of 0.800 on performance of electoral systems in Kenya. The t-values assess the significance of the coefficients. For the constant term, the t-value is 7.556, and for inventory management practices, it is an impressive 20.138. Both t-values are accompanied by a significance level of 0.000, indicating a highly significant relationship between these variables and the performance of electoral systems. For Collinearity Statistics: Collinearity refers to the interrelationship among independent variables in a regression model. The table provides two collinearity statistics: tolerance and VIF (Variance Inflation Factor). A tolerance value of 1.000 and a VIF value of 1.000 for inventory management practices suggest no collinearity issues. This means that the independent variable stands on its own and does not suffer from correlation with other variables in the model. Based on the analysis presented in the table, it can be concluded that inventory management practices have a significant and positive impact on the performance of electoral systems. The coefficients, t-values, and significance levels indicate that as inventory management practices improve, the performance of electoral systems tends to improve as well. This coefficient aligns with insights from various election petitions cases and scholarly literature. For instance, in *Maina Kiai v. Attorney General (2018)* in Kenya, inadequate inventory management led to

delays and allegations of tampering, directly impacting electoral transparency and fairness. Similarly, *Bush v. Gore (2000)* in the United States highlighted how meticulous inventory management of ballots is crucial for upholding electoral integrity and avoiding legal disputes.

Scholarly literature also supported these observations. Ehimare *et al.* (2023) emphasize that well-managed inventory systems ensure timely delivery and secure handling of election materials, which are critical for transparent vote counting and result accuracy. Panjaitan *et al.* (2024) discuss how effective logistics and inventory management minimize errors and delays, contributing to credible electoral outcomes and public trust in electoral processes.

Table 4.22: Coefficients for Role of Inventory Management Practices on the Performance of Electoral Systems in Kenya

Coefficients ^a								
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics		
	B	Std. Error	Beta			Tolerance	VIF	
2 (Constant)	1.085	.144		7.556	.000			
Inventory management practices	.800	.040	.889	20.138	.000	1.000	1.000	

a. Dependent Variable: Performance of electoral systems

4.6.2.8 Regression Analysis for the Relationship between Transportation Management Practices and Performance of Electoral Systems in Kenya.

The third objective of the study was designed to examine the relationship between transportation management practices and performance of electoral systems in Kenya. The literature that was reviewed in this study as well as theoretical reasoning associated transportation management practices with performance of electoral systems in Kenya. In this case, performance of electoral systems in Kenya was guided by the following indicator by reliability, voter turnout, consistency and credibility while transportation management practices were guided by the following indicators that is Delivery voting material on site, Transportation security and Reverse logistics

Following the theoretical arguments, the following null research hypothesis was formulated and tested:

Ho₃: Transportation management practices have no significant role on performance of electoral systems in Kenya.

4.6.2.9 Regression Model Summary of Relationship between Transportation Management Practices and Performance of Electoral Systems in Kenya.

The table below presented a model summary that examines the relationship between transportation management practices and performance of electoral systems in Kenya. The summary provides important statistical measures and change statistics to assess the overall quality and effectiveness of the model. The correlation coefficient (R) measures the strength and direction of the linear relationship between the predictors (transport management) and the dependent variable (performance of electoral systems). In this model, the correlation coefficient is 0.712a, indicating a moderately strong positive correlation between transport management and electoral system performance. This suggests that higher levels of transport management are associated with better performance of electoral systems. Iwuoha *et al.* (2021) discussed the logistical challenges and political interference associated with transportation of election materials in Nigeria. Similar issues could impact Kenya, affecting the timely and secure delivery of ballots and materials, crucial for maintaining electoral integrity. Ugwuibe *et al.* (2020) critiqued the Nigerian electoral administration, emphasizing the importance of efficient logistics, including transportation, in ensuring fair and credible elections. Their findings underscore the universal relevance of robust transportation management practices. Ehimare *et al.* (2023) highlighted logistical challenges during Nigerian elections, proposing solutions such as Unmanned Aircraft Systems (UAS) to improve transportation efficiency. Such innovations could inspire improvements in Kenya's electoral logistics. The coefficient of determination (R Square) represents the proportion of the variance in the dependent variable that can be explained by the predictors. In this model, the R Square value is 0.507, indicating that approximately 50.7% of the variation in electoral system performance can be explained by transport

management. This implies that transport management is a significant factor influencing the performance of electoral systems. The adjusted R Square accounts for the number of predictors and adjusts the R Square value accordingly. In this model, the adjusted R Square is 0.502, which suggests that transport management accounts for a substantial portion of the variation in electoral system performance, even after considering the number of predictors. The standard error of the estimate provides an estimate of the average deviation between the observed values and the predicted values of the dependent variable. In this model, the standard error of the estimate is 0.45488. A lower value indicates a better fit of the model, suggesting that the predicted values are closer to the actual values of electoral system performance. The change statistics and Durbin-Watson test assess the significance of the model and the presence of autocorrelation, which is the correlation between the residuals. Morley (2017) and Thompson *et al.* (2023) explored election emergencies and the preparations of electoral commissions, respectively. Their insights underscore the need for resilient transportation strategies to mitigate risks and ensure elections proceed smoothly despite challenges. In this model, the R Square Change is 0.507, indicating a significant improvement in the model's fit after adding transport management as a predictor. The F Change value is 110.870, which exceeds the critical value, suggesting that the improvement in the model's fit is statistically significant. The Durbin-Watson statistic measures autocorrelation, with a value of 2.093. A value between 1.5 and 2.5 indicates no significant autocorrelation in the model's residuals.

Table 4.23: Regression Analysis for the Relationship between Transportation Management Practices and Performance of Electoral Systems in Kenya

Model Summary^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Sig. F Change	Durbin-Watson
					R Square Change	F Change	df1	df2		
1	.712 ^a	.507	.502	.45488	.507	110.870	1	108	.000	2.093

a. Predictors: (Constant), Transport management

b. Dependent Variable: Performance of electoral systems

4.6.2.10 Analysis of Variance for the Role of Transport Management Practices on the Performance of Electoral Systems in Kenya

In this case, the regression model shows a significant effect on the dependent variable (Performance of electoral systems). The F-value for the regression model is 110.870, indicating the ratio of the mean square for the regression to the mean square for the residual. A higher F-value suggests a greater significance of the predictors. In this case, the F-value is substantial, suggesting a strong relationship between transport management and the performance of electoral systems. The significance level (p-value) is 0.000, indicating that the regression model is statistically significant. Thus, transport management significantly explains the performance of electoral systems. The regression model explains a significant amount of variance in the dependent variable, as indicated by the large sum of squares for the regression compared to the residual sum of squares. The sum of squares analysis confirms that the regression model explains a considerable portion of the variability in electoral system performance. However, there is also some unexplained variation represented by the residual sum of squares. Further investigation may be necessary to identify other variables or factors that contribute to the remaining unexplained variability. Nonetheless, Ugwuibe *et al.* (2020) critiqued Nigeria's 2019 elections, emphasizing logistical inefficiencies in transportation that affected electoral processes. Lessons from Nigeria underscore the need for streamlined transportation to ensure fair elections in Kenya. Ehimare *et al.* (2023) proposed solutions like Unmanned Aircraft Systems (UAS) for efficient election logistics in Nigeria. Such innovations could inspire Kenya to adopt advanced technologies to enhance transportation reliability and security. Adoki *et al.* (2023) analyzed the management of the 2015 elections in Rivers State, Nigeria, focusing on logistical challenges and their impact on election outcomes. Similar issues could arise in Kenya, necessitating robust transportation management practices. Panjaitan *et al.* (2024) discussed financial governance and logistics in elections, highlighting the critical role of effective transportation management in ensuring credible electoral processes. Their insights are applicable to Kenya's context, emphasizing the need for stringent logistical controls.

Table 4.24: Analysis of Variance for the Role of Transport Management Practices on the Performance of Electoral Systems in Kenya

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
3	Regression	22.941	1	22.941	110.870	.000 ^b
	Residual	22.347	108	.207		
	Total	45.288	109			

a. Dependent Variable: Performance of electoral systems

b. Predictors: (Constant), Transport management

4.6.2.11 Coefficients for Role of Transport Management Practices on the Performance of Electoral Systems in Kenya

The explored regression test indicates that there was a significant role of Transport management practices on the performance of electoral systems in Kenya. From the regression model expressed by

$$Y = 0.997 + 0.738X_3$$

a change by a unit in Transport management practices lead to a correspondent change of 0.738 on performance of electoral systems in Kenya. The constant term in the model represents the intercept, indicating the value of the dependent variable (performance of electoral systems) when all predictors are zero. In this case, the constant value is 0.997. The standard error associated with the constant is 0.281, which reflects the precision of the estimated coefficient. The t-value of 3.551 suggests that the constant term is statistically significant at a significance level of 0.001. The coefficient for transport management measures the change in the dependent variable associated with a one-unit change in the predictor. In this model, the unstandardized coefficient for transport management is 0.738, indicating that a one-unit increase in transport management is associated with a 0.738 increase in the performance of electoral systems. The standard error of the transport management coefficient is 0.070, indicating the precision of the estimate. The t-value of 10.529 suggests that the coefficient is statistically significant at a significance level of 0.000, indicating a strong relationship between transport management and electoral system performance.

The standardized coefficients provide a measure of the relative importance of each predictor in predicting the dependent variable. In this model, the standardized coefficient (Beta) for transport management is 0.712. This value represents the change in the dependent variable, in standard deviation units, associated with a one-standard-deviation change in transport management. A standardized coefficient of 0.712 indicates that transport management has a strong positive impact on the performance of electoral systems.

Collinearity statistics assess the multicollinearity among predictors, which is the extent to which predictors are correlated with each other. These was achieving measuring tolerance value and Variance Inflation Factor. The tolerance value indicates the proportion of the variance in the predictor variable that is not accounted for by other predictors. In this case, the tolerance value for transport management is 1.000, suggesting that there is no issue of multicollinearity with other predictors while the VIF (Variance Inflation Factor) is the reciprocal of the tolerance and measures the degree of multicollinearity. A VIF of 1.000 indicates no multicollinearity, which is the case for transport management. In conclusion, these findings highlight the importance of effective transport management strategies in optimizing the performance of electoral systems, providing valuable insights for policymakers and electoral organizations to improve logistics and transportation operations.

Table 4.25: Coefficients for Role of Transport Management Practices on the Performance of Electoral Systems in Kenya

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error				Tolerance	VIF
1	(Constant)	.997	.281		3.551	.001		
	Transport management	.738	.070	.712	10.529	.000	1.000	1.000

a. Dependent Variable: Performance of electoral systems

4.6.2.4 Regression Analysis for the Relationship between Logistics Communication and Performance of Electoral Systems in Kenya.

The fourth objective of the study was designed to examine the role of Logistics communication practices on performance of electoral systems in Kenya. The literature that was reviewed in this study as well as theoretical reasoning associated Logistics communication with performance of electoral systems in Kenya. In this case, performance of electoral systems in Kenya was guided by the following indicator by reliability, voter turnout, consistency and credibility while Logistics communication was guided by the following indicators that is Mode of communication, Communication Network Needs and Communication procedure

Following the theoretical arguments, the following null research hypothesis was formulated and tested:

H₀₄: *Logistics communication has no significant role on performance of electoral systems in Kenya.*

4.6.2.12 Regression Model Summary for the Relationship between Logistics Communication and Performance of Electoral Systems in Kenya.

The table below presented a model summary that examines the relationship between logistics communication and performance of electoral systems in Kenya. The regression analysis demonstrated a significant relationship between logistics communication and electoral system performance in Kenya. The R Square value of 0.576 indicated that 57.6% of the variability in electoral system performance can be attributed to variations in logistics communication practices. This high R Square value underscores the substantial influence that effective communication has on enhancing the overall efficiency and integrity of electoral processes. Ehimare *et al.* (2023) underscored the pivotal role of effective logistics communication in Nigerian elections, stressing how clear communication channels foster transparency and timely delivery of election materials. Their insights are applicable to Kenya, where similar challenges in logistics can impact electoral outcomes. Panjaitan *et al.* (2024) discussed the transformative impact of communication technologies on electoral

logistics, advocating for their adoption to streamline operations and minimize logistical challenges. Their findings advocate for Kenya's adoption of modern communication tools to enhance electoral efficiency and transparency.

The Adjusted R Square of 0.572 further confirmed the robustness of the model, accounting for the number of predictors included. This adjustment ensures that the identified relationship is not spurious and remains statistically reliable.

Moreover, the F-Value of 146.451 is highly significant ($p < 0.001$), indicating that the observed relationship between logistics communication and electoral system performance is not due to chance. This statistical significance reinforces the argument that efficient communication channels, facilitating timely information sharing and coordination among electoral stakeholders, play a critical role in upholding electoral integrity and efficiency in Kenya. *Maina Kiai v. Attorney General (2018), Kenya* highlighted the adverse effects of poor communication among electoral officials, leading to delays and disputes. Such incidents illustrate how inadequate logistics communication can undermine electoral credibility and fairness, emphasizing the need for improved communication protocols. *Bush v. Gore (2000), United States* A landmark ruling that exposed logistical and communication failures in handling ballots, underscoring the legal ramifications of flawed electoral logistics. This case serves as a cautionary tale, demonstrating how communication breakdowns can jeopardize electoral integrity and legitimacy.

The Durbin-Watson statistic measures the presence of autocorrelation (correlation between error terms) in the model. The value of 1.998 indicates that there might be some positive autocorrelation present in the model's residuals. Typically, a value between 1.5 and 2.5 is considered acceptable, with values closer to 2 indicating no significant autocorrelation.

Table 4.26: Regression Analysis for the Relationship between Logistics Communication and Performance of Electoral Systems in Kenya.

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.759 ^a	.576	.572	.42188	.576	146.451	1	108	.000	1.998

a. Predictors: (Constant), Logistic communication

b. Dependent Variable: Performance of electoral systems

4.6.2.13 Analysis of Variance for the role of Logistic communication on the performance of electoral systems in Kenya

The ANOVA analysis demonstrated that the regression model incorporating logistic communication significantly explained the variance in electoral system performance in Kenya. With a Regression Sum of Squares (SS) of 26.066 and a relatively low Residual Sum of Squares of 19.222, the model effectively captured and explained the majority of performance variance attributed to logistic communication. The high F-value of 146.451, which is statistically significant ($p < 0.001$), underscored that logistic communication plays a pivotal role in predicting electoral outcomes, emphasizing its robust relationship with electoral system performance. Scholarly literature, such as Ehimare *et al.* (2023) and Panjaitan *et al.* (2024), supports these findings by highlighting the critical role of effective communication channels among election stakeholders in ensuring transparent and efficient electoral processes. Legal cases like Maina Kiai v. Attorney General (2018) in Kenya and Bush v. Gore (2000) in the United States further illustrate how inadequate logistic communication can lead to delays and disputes, emphasizing the imperative of clear communication strategies to maintain electoral integrity and fairness.

Table 4.27: Analysis of Variance for the Role of Logistic Communication on the Performance of Electoral Systems in Kenya

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	26.066	1	26.066	146.451	.000 ^b
	Residual	19.222	108	.178		
	Total	45.288	109			

a. Dependent Variable: Performance of electoral systems

b. Predictors: (Constant), Logistic communication

4.6.2.14 Coefficients for role of Logistic Communication on the Performance of Electoral Systems in Kenya

The explored regression test indicates that there was a significant role of Logistic communication on the performance of electoral systems in Kenya. From the regression model expressed by

$$Y = 2.396 + 0.431X_4$$

a change by a unit in Logistic communication lead to a correspondent change of 0.431 on performance of electoral systems in Kenya. The constant term in the model represents the intercept, indicating the value of the dependent variable (performance of electoral systems) when all predictors are zero.

The unstandardized coefficients represent the raw values of the estimated regression equation. In this case, the study had two coefficients: Constant: The constant term was 2.396. It represents the expected value of the dependent variable when the predictor variable (Logistic communication) is zero. In other words, even in the absence of logistic communication, the performance of electoral systems is expected to be 2.396. and the coefficient for logistic communication was 0.431. This indicates that, on average, a one-unit increase in logistic communication is associated with a 0.431 increase in the performance of electoral systems.

The standardized coefficients, also known as beta coefficients, allow for the comparison of the relative importance of each predictor variable. Here, study had one standardized coefficient that is the standardized coefficient (beta) for logistic

communication which was 0.759. It represented the change in standard deviations of the dependent variable associated with a one-standard-deviation increase in logistic communication. It indicates that logistic communication has a moderately strong positive impact on the performance of electoral systems.

For the t-values and Significance: The t-values assess the significance of each coefficient and determine if they significantly differ from zero. The associated significance levels (Sig.) indicate the probability of obtaining the observed results by chance. In this case, the results were as follows: Constant: The t-value for the constant term was 18.147, and the significance level is 0.000 (or <0.001). This indicated that the constant term is statistically significant and significantly different from zero. It implies that even without logistic communication, the performance of electoral systems is significantly higher than zero. The t-value for logistic communication was 12.102, with a significance level of 0.000 (or <0.001). This suggests that the coefficient for logistic communication is statistically significant, implying a significant relationship between logistic communication and the performance of electoral systems.

The collinearity statistics assess the presence of multicollinearity, which occurs when predictor variables are highly correlated with each other. Here, the study had two statistics: Tolerance: The tolerance statistic measures the extent to which one predictor variable can be predicted by the other predictor variables. A tolerance value close to 1 indicates low multicollinearity. In this case, both the constant and logistic communication have tolerance values of 1.000, indicating no multicollinearity issues. VIF (Variance Inflation Factor): The VIF is the reciprocal of the tolerance and measures the increase in the standard error due to multicollinearity. A VIF value above 1 indicates the presence of multicollinearity. Since both the constant and logistic communication have VIF values of 1.000, there is no issue of multicollinearity.

Table 4.28: Coefficients for Role of Logistic Communication on the Performance of Electoral Systems in Kenya

Coefficients^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.396	.132		18.147	.000		
	Logistic communication	.431	.036	.759	12.102	.000	1.000	1.000

a. Dependent Variable: Performance of electoral systems

4.6.2.15 Regression Analysis for the Moderating Role of Election Laws on Relationship between Logistics Management Practices and Performance of Electoral Systems in Kenya

In this section the study looks at how election law's moderate role on relationship between logistics management practices (Logistics planning, Inventory management, Transportation management, logistics communication) and performance of electoral systems in Kenya

4.6.2.16 Regression Analysis for the Moderating Role of Election Laws on Relationship between Logistics Planning and Performance of Electoral Systems in Kenya

The regression analysis for the moderating role of election laws on the relationship between logistics planning and the performance of electoral systems in Kenya provided significant insights. In Model 1, the R Square value of 0.319 indicates that logistic planning alone explains 31.9% of the variance in electoral system performance. Adding election laws as a moderating variable in Model 2 increases the R Square to 0.564, meaning 56.4% of the variance in performance is explained when both logistic planning and election laws are considered. This substantial increase in explanatory power, evidenced by an R Square Change of 0.245 and an F Change of 59.956 ($p < 0.001$), underscores the critical role of election laws in enhancing the impact of logistics planning on electoral outcomes. Scholarly contributions by Ehimare *et al.* (2023) highlight the importance of clear legal frameworks in logistics communication during elections, demonstrating that well-defined laws facilitate

efficient planning and execution of logistics, ensuring transparency and reducing potential disputes. Panjaitan *et al.* (2024) discuss how election laws can provide a structured environment that enhances logistical operations through better coordination and reduced bottlenecks. Legal case support, such as Maina Kiai v. Attorney General (2018) in Kenya, underscores the detrimental effects of inadequate logistic planning compounded by weak legal frameworks, while Bush v. Gore (2000) in the United States emphasizes the critical role of legal structures in managing election logistics. Ugwuibe *et al.* (2020) critique the 2019 Nigerian general elections, pointing out that inconsistencies in legal frameworks led to significant logistical challenges, emphasizing the need for comprehensive election laws to support effective logistics planning and execution. The analysis shows that while logistics planning is crucial for the performance of electoral systems, robust election laws significantly enhance its effectiveness by providing clear guidelines and reducing uncertainties, resulting in more efficient logistics management, timely delivery of materials, and overall improved electoral integrity and fairness.

Table 4.29: Regression Analysis for the Moderating Role of Election Laws on Relationship between Logistics Planning and Performance of Electoral Systems in Kenya

Model Summary ^c										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.565 ^a	.319	.313	.53438	.319	50.593	1	108	.000	
2	.751 ^b	.564	.555	.42980	.245	59.956	1	107	.000	2.432

a. Predictors: (Constant), Logistic planning
b. Predictors: (Constant), Logistic planning, Election laws
c. Dependent Variable: Performance of electoral systems

The ANOVA table provided insights into how logistic planning and election laws affect the performance of electoral systems in Kenya. In Model 1, logistic planning alone explains a significant portion of the variance in electoral system performance, with a regression sum of squares of 14.447, a mean square of 14.447, and an F-value of 50.593 ($p < 0.001$). When election laws are included in Model 2, the regression sum of squares increases to 25.523, the mean square is 12.761, and the F-value rises to 69.083 ($p < 0.001$), indicated the substantial role of election laws in enhancing the model's predictive power. Scholarly contributions supported these findings: Ehimare

et al. (2023) emphasized the importance of clear legal frameworks for efficient logistics communication; Panjaitan *et al.* (2024) highlighted how modern communication tools and robust legal structures reduce logistical bottlenecks; Adoki *et al.* (2023) showed that comprehensive election laws mitigate logistical challenges; and Ugwuibe *et al.* (2020) pointed out that inconsistencies in legal frameworks lead to logistical problems. Legal cases further illustrated these points: *Maina Kiai v. Attorney General (2018) in Kenya* shows the impact of poor logistic planning and weak legal frameworks; *Bush v. Gore (2000) in the US* underscored the role of legal structures in managing election logistics; *Chamisa v. Mnangagwa (2018) in Zimbabwe* highlighted the need for stringent election laws; *Marcos v. Robredo (2016) in the Philippines* emphasizes the role of clear legal guidelines; and *Akufo-Addo v. Mahama (2020) in Ghana* illustrates how robust legal frameworks prevent logistical issues. The analysis demonstrates that both logistic planning and election laws are crucial for the effective performance of electoral systems in Kenya, providing clear guidelines and reducing uncertainties for more efficient logistics management and improved electoral integrity and fairness..

Table 4.30: Analysis of Variance for the Moderating Role of Election Laws on Relationship between Logistics Planning and Performance of Electoral Systems in Kenya

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.447	1	14.447	50.593	.000 ^b
	Residual	30.841	108	.286		
	Total	45.288	109			
2	Regression	25.523	2	12.761	69.083	.000 ^c
	Residual	19.765	107	.185		
	Total	45.288	109			

a. Dependent Variable: Performance of electoral systems

b. Predictors: (Constant), Logistic planning

c. Predictors: (Constant), Logistic planning, Election laws

The coefficients table illustrated the significant impact of logistic planning and election laws on the performance of electoral systems in Kenya. In Model 1, logistic planning alone had a substantial effect, with an unstandardized coefficient (B) of 0.525, a standardized coefficient (Beta) of 0.565, and a significant t-value of 7.113 (p

< 0.001), indicating that effective logistic planning positively influenced the performance of electoral systems. In Model 2, the inclusion of election laws significantly enhanced the model, with the constant decreasing to 1.319, logistic planning's unstandardized coefficient reducing to 0.209 (Beta = 0.225) and a t-value of 2.902 ($p = 0.005$), and election laws displaying a strong unstandardized coefficient of 0.468 (Beta = 0.600) and a highly significant t-value of 7.743 ($p < 0.001$). These changes underscored the critical role of election laws in amplifying the positive effects of logistic planning. Scholarly contributions from Ehimare *et al.* (2023) emphasized how clear legal frameworks facilitated efficient logistic communication during elections, while Panjaitan *et al.* (2024) discussed the benefits of communication technologies and strong legal frameworks in improving logistical operations. Adoki *et al.* (2023) highlighted how comprehensive election laws mitigated logistical challenges in Nigerian elections, and Ugwuibe *et al.* (2020) critiqued the 2019 Nigerian general elections, pointing out how legal and logistical inconsistencies led to significant administrative challenges. Legal case support from *Maina Kiai v. Attorney General* (2018), Kenya, *Bush v. Gore* (2000), United States, *Chamisa v. Mnangagwa* (2018), Zimbabwe, *Marcos v. Robredo* (2016), Philippines, and *Akufo-Addo v. Mahama* (2020), Ghana, illustrated the importance of robust legal frameworks in preventing logistical failures and ensuring electoral integrity. The analysis revealed that while logistic planning was essential for the performance of electoral systems, the presence of robust election laws significantly enhanced this relationship, resulting in more efficient logistics management, timely delivery of materials, and overall improved electoral integrity and fairness. Therefore, both logistic planning and election laws were crucial for ensuring the effective performance of electoral systems in Kenya

$$Y = 1.319 + 0.209X_1 + 0.468X_2$$

Table 4.31: Coefficients for the Moderating Role of Election Laws on Relationship between Logistics Planning and Performance of Electoral Systems in Kenya

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	Collinearity Statistics	
		B	Std. Error				Tolerance	VIF
1	(Constant)	1.927	.285		6.770	.000		
	Logistic planning	.525	.074	.565	7.113	.000	1.000	1.000
2	(Constant)	1.319	.242		5.451	.000		
	Logistic planning	.209	.072	.225	2.902	.005	.679	1.473
	Election laws	.468	.060	.600	7.743	.000	.679	1.473

a. Dependent Variable: Performance of electoral systems

4.6.2.17 Regression Analysis for the Moderating Role of Election Laws on Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya

The model summary table demonstrated the significant impact of inventory management practices and election laws on the performance of electoral systems in Kenya. In Model 1, inventory management practices alone explained 79.0% of the variance in performance (R Square = 0.790) with an F-value of 405.528 ($p < 0.001$), indicating a strong relationship. When election laws were included in Model 2, the R Square increased slightly to 0.804, explaining 80.4% of the variance, with a significant R Square change of 0.015 and an F Change of 7.939 ($p = 0.006$). This underscored the added value of election laws in enhancing the model's explanatory power. Scholarly contributions, such as Ehimare *et al.* (2023), emphasized the importance of clear legal frameworks in facilitating efficient logistics communication, while Panjaitan *et al.* (2024) discussed the benefits of robust legal structures in improving logistical operations. Adoki *et al.* (2023) and Ugwuibe *et al.* (2020) highlighted how comprehensive election laws mitigate logistical challenges and support effective planning. Legal cases like Maina Kiai v. Attorney General (2018), Bush v. Gore (2000), Chamisa v. Mnangagwa (2018), Marcos v. Robredo (2016), and Akufo-Addo v. Mahama (2020) illustrated the critical role of robust legal frameworks in preventing logistical failures and ensuring electoral integrity.

Therefore, both inventory management practices and election laws were crucial for the effective performance of electoral systems in Kenya.

Table 4.32: Regression Analysis for the Moderating Role of Election Laws on Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya

Model Summary^c										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F	df1	df2	Sig. Change	Durbin-Watson
1	.889 ^a	.790	.788	.29697	.790	405.528	1	108	.000	
2	.897 ^b	.804	.801	.28787	.015	7.939	1	107	.006	2.072

a. Predictors: (Constant), Inventory management practices

b. Predictors: (Constant), Inventory management practices, Election laws

c. Dependent Variable: Performance of electoral systems

Analysis of Variance for the Moderating Role of Election Laws on Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya

The ANOVA table illustrated the significant impact of inventory management practices and election laws on the performance of electoral systems in Kenya. In Model 1, the regression sum of squares was 35.764, with a mean square of 35.764 and an F-value of 405.528 ($p < 0.001$), indicating that inventory management practices alone significantly explained the variance in electoral system performance. In Model 2, the inclusion of election laws increased the regression sum of squares to 36.421, with a mean square of 18.211 and an F-value of 219.761 ($p < 0.001$), demonstrating that election laws further enhanced the model's explanatory power. Scholarly contributions, such as Ehimare *et al.* (2023), emphasized that clear legal frameworks facilitated efficient logistics communication, while Panjaitan *et al.* (2024) highlighted the benefits of robust legal structures in improving logistical operations. Adoki *et al.* (2023) and Ugwuibe *et al.* (2020) showed how comprehensive election laws mitigated logistical challenges and supported effective planning. Legal cases like Maina Kiai v. Attorney General (2018), Bush v. Gore (2000), Chamisa v. Mnangagwa (2018), Marcos v. Robredo (2016), and Akufo-Addo v. Mahama (2020) illustrated the critical role of robust legal frameworks in preventing logistical failures and ensuring electoral integrity. Therefore, both

inventory management practices and election laws were crucial for the effective performance of electoral systems in Kenya.

Table 4.33: Analysis of Variance for the Moderating Role of Election Laws on Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.764	1	35.764	405.528	.000 ^b
	Residual	9.525	108	.088		
	Total	45.288	109			
2	Regression	36.421	2	18.211	219.761	.000 ^c
	Residual	8.867	107	.083		
	Total	45.288	109			

a. Dependent Variable: Performance of electoral systems

b. Predictors: (Constant), Inventory management practices

c. Predictors: (Constant), Inventory management practices, Election laws

The coefficients table demonstrated the significant moderating role of election laws on the relationship between inventory management practices and the performance of electoral systems in Kenya. In Model 1, inventory management practices alone had a substantial impact, with an unstandardized coefficient (B) of 0.800 and a standardized coefficient (Beta) of 0.889, showing a significant t-value of 20.138 ($p < 0.001$). In Model 2, the inclusion of election laws reduced the unstandardized coefficient of inventory management to 0.686 (Beta = 0.762) with a significant t-value of 12.259 ($p < 0.001$), while election laws themselves showed an unstandardized coefficient of 0.136 (Beta = 0.175) with a significant t-value of 2.818 ($p = 0.006$). This indicated that election laws played a crucial moderating role, enhancing the effectiveness of inventory management practices on electoral performance. Scholarly contributions by Ehimare *et al.* (2023) and Panjaitan *et al.* (2024) emphasized the importance of legal frameworks and modern technologies in electoral logistics. Adoki *et al.* (2023), Ugwuibe *et al.* (2020), and Musiał-Karg & Kapsa (2024) further highlighted how comprehensive election laws mitigated logistical challenges. Legal cases such as Maina Kiai v. Attorney General (2018), Bush v. Gore (2000), Chamisa v. Mnangagwa (2018), Marcos v. Robredo (2016), and Akufo-Addo v. Mahama (2020) illustrated the critical role of robust legal

frameworks in preventing logistical failures and ensuring electoral integrity. Thus, both inventory management practices and election laws were essential for the effective performance of electoral systems in Kenya.

$$Y=0.963+0.686X_1*0.136$$

Table 4.34: Coefficients for the Moderating role of election laws on relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.085	.144		7.556	.000		
	Inventory management	.800	.040	.889	20.138	.000	1.000	1.000
2	(Constant)	.963	.146		6.605	.000		
	Inventory management	.686	.056	.762	12.259	.000	.474	2.110
	Election laws	.136	.048	.175	2.818	.006	.474	2.110

a. Dependent Variable: Performance of electoral systems

4.6.2.18 Regression Analysis for the Moderating Role of Election Laws on Relationship between Transport Management Practices and Performance of Electoral Systems in Kenya

The model summary table illustrates the significant impact of transport management and election laws on the performance of electoral systems in Kenya. In Model 1, transport management alone explained a substantial portion of the variance, with an R Square of 0.507 and an Adjusted R Square of 0.502. The model's effectiveness was supported by a low standard error of the estimate (0.45488) and a highly significant F Change value of 110.870 ($p < 0.001$). Model 2, which included election laws alongside transport management, showed an increased R Square of 0.656 and an Adjusted R Square of 0.650, indicating that 65.0% of the variance in electoral system performance could be explained by these predictors. The F Change of 46.599 ($p < 0.001$) further underscored the enhanced predictive power of the model when election laws were added. This highlights that election laws played a crucial role in augmenting the positive effects of transport management on electoral outcomes. Scholarly contributions by Iwuoha *et al.* (2021), Rochweg (2024), Ugwuibe *et al.*

(2020), and Ehimare *et al.* (2023) emphasize the importance of logistical efficiency and legal frameworks in electoral processes. Legal cases such as Maina Kiai v. Attorney General (2018) and Chamisa v. Mnangagwa (2018) underscore the necessity of robust legal frameworks in managing logistical challenges and ensuring electoral integrity. Therefore, the combined influence of transport management and election laws significantly contributed to the performance of electoral systems in Kenya, reflecting their critical roles in electoral logistics and governance.

Table 4.35: Regression Analysis for the Moderating Role of Election Laws on Relationship between Transport Management Practices and Performance of Electoral Systems in Kenya

Model Summary ^c									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Durbin-Watson
					R Square Change	F Change	df1	df2	
1	.712 ^a	.507	.502	.45488	.507	110.870	1	108	.000
2	.810 ^b	.656	.650	.38143	.150	46.599	1	107	.000

a. Predictors: (Constant), Transport management

b. Predictors: (Constant), Transport management, Election laws

c. Dependent Variable: Performance of electoral systems

The ANOVA table demonstrates the significant moderating role of election laws on the relationship between transport management practices and the performance of electoral systems in Kenya. In Model 1, which considered only transport management as a predictor, the regression sum of squares was 22.941, with a mean square of 22.941 and a highly significant F-value of 110.870 ($p < 0.001$). This indicated that transport management practices alone explained a substantial amount of variance in electoral system performance. Model 2, incorporating both transport management and election laws as predictors, showed an increase in the regression sum of squares to 29.721 and a mean square of 14.860, with a significant F-value of 102.140 ($p < 0.001$). The addition of election laws thus enhanced the model's explanatory power, underscoring their crucial role in amplifying the impact of transport management on electoral outcomes. Scholarly literature, including studies by Iwuoha *et al.* (2021), Rochweg (2024), and Ugwuibe *et al.* (2020), consistently highlight the importance of efficient logistical practices and robust legal frameworks in electoral processes. Legal cases such as Maina Kiai v. Attorney General (2018) and Chamisa v. Mnangagwa (2018) provide empirical evidence of the critical need

for effective management of logistical challenges through enhanced legal oversight. Therefore, the combined influence of transport management practices and election laws significantly contributes to the performance of electoral systems in Kenya, emphasizing the pivotal role of both factors in ensuring transparent and credible elections.

Table 4.36: Analysis of Variance for the Moderating Role of Election Laws on Relationship between Transport Management Practices and Performance of Electoral Systems in Kenya

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.941	1	22.941	110.870	.000 ^b
	Residual	22.347	108	.207		
	Total	45.288	109			
2	Regression	29.721	2	14.860	102.140	.000 ^c
	Residual	15.567	107	.145		
	Total	45.288	109			

a. Dependent Variable: Performance of electoral systems

b. Predictors: (Constant), Transport management

c. Predictors: (Constant), Transport management, Election laws

The coefficients table illustrates the significant moderating effect of election laws on the relationship between transport management practices and the performance of electoral systems in Kenya. In Model 1, transport management had an unstandardized coefficient (B) of 0.738, with a standardized coefficient (Beta) of 0.712 and a highly significant t-value of 10.529 ($p < 0.001$). This indicates that effective transport management practices positively influenced electoral system performance. Model 2, which included election laws as an additional predictor, showed adjustments in coefficients: the constant decreased to 0.696, while the unstandardized coefficient for transport management reduced to 0.453 (Beta = 0.437), with a t-value of 6.288 ($p < 0.001$). Meanwhile, election laws exhibited an unstandardized coefficient of 0.370 (Beta = 0.474) and a significant t-value of 6.826 ($p < 0.001$). These findings underscore the critical role of election laws in amplifying the positive impact of transport management on electoral outcomes. Scholarly literature, including studies by Iwuoha *et al.* (2021), Rochwerg (2024), and Ugwuibe *et al.* (2020), consistently highlight how effective logistical practices and strong legal

frameworks are essential for transparent and efficient electoral processes. Legal cases such as *Maina Kiai v. Attorney General* (2018) and *Chamisa v. Mnangagwa* (2018) provide empirical evidence of the importance of managing logistical challenges through enhanced legal oversight. Therefore, the combined influence of transport management practices and election laws significantly contributes to the performance of electoral systems in Kenya, emphasizing the pivotal role of both factors in ensuring credible and transparent elections.

$$Y=0.696+0.453X_1+0.370X_2$$

Table 4.37: Coefficients for the Moderating Role of Election Laws on Relationship between Transport Management Practices and Performance of Electoral Systems in Kenya

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.997	.281		3.551	.001		
	Transport management	.738	.070	.712	10.529	.000	1.000	1.000
2	(Constant)	.696	.240		2.906	.004		
	Transport management	.453	.072	.437	6.288	.000	.665	1.504
	Election laws	.370	.054	.474	6.826	.000	.665	1.504

a. Dependent Variable: Performance of electoral systems

4.6.2.19 Regression Analysis for the Moderating role of Election Laws on Relationship between Logistics Communication and Performance of Electoral Systems in Kenya

The regression analysis highlights the significant moderating effect of election laws on the relationship between logistics communication and the performance of electoral systems in Kenya. In Model 1, logistics communication alone explains 57.6% of the variance in electoral system performance, as indicated by an R Square of 0.576 and an Adjusted R Square of 0.572. The model's F-value of 146.451 ($p < 0.001$) underscores the statistical significance of this relationship, suggesting that effective logistics communication positively influences electoral outcomes. Model 2, which includes election laws as an additional predictor, shows improvements: the R Square increases to 0.653, with an Adjusted R Square of 0.647. This improvement, evidenced by an R Square Change of 0.077 and an F Change of 23.893 ($p < 0.001$), demonstrates that election laws enhance the predictive power of the model. This finding aligns with scholarly literature such as studies by Ehimare *et al.* (2023) and Panjaitan *et al.* (2024), which emphasize the role of clear legal frameworks in facilitating efficient logistics communication and improving electoral processes. Legal cases like *Maina Kiai v. Attorney General* (2018) and *Bush v. Gore* (2000) further illustrate how logistical and communication failures can impact electoral integrity, underscoring the critical need for robust legal frameworks to support effective logistics communication in elections. Therefore, both logistics communication and election laws play integral roles in ensuring the performance and credibility of electoral systems in Kenya.

Table 4.38: Regression Analysis for the Moderating Role of Election Laws on Relationship between Logistics Communication and Performance of Electoral Systems in Kenya

Model Summary ^c										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.759 ^a	.576	.572	.42188	.576	146.451	1	108	.000	2.137
2	.808 ^b	.653	.647	.38322	.077	23.893	1	107	.000	

a. Predictors: (Constant), Logistics communication

b. Predictors: (Constant), Logistics communication, Election laws

c. Dependent Variable: Performance of electoral systems

The ANOVA table illustrated the significant moderating effect of election laws on the relationship between logistic communication and the performance of electoral systems in Kenya. In Model 1, logistic communication alone contributes 26.066 to the regression sum of squares, with a corresponding F-value of 146.451 ($p < 0.001$), indicating a strong statistical significance. This suggests that effective logistic communication is crucial in explaining variations in electoral system performance. Model 2, which includes election laws as an additional predictor, shows an increase in the regression sum of squares to 29.575 and a significant F-value of 100.694 ($p < 0.001$). This improvement highlights the enhanced predictive power of the model when election laws are considered, indicating that election laws amplify the impact of logistic communication on electoral outcomes. This finding aligns with scholarly literature such as studies by Ehimare *et al.* (2023) and Panjaitan *et al.* (2024), which emphasize the role of legal frameworks in enhancing communication effectiveness in electoral logistics. Legal cases like Maina Kiai v. Attorney General (2018) and Bush v. Gore (2000) further underscore the importance of clear communication protocols and legal guidelines in mitigating logistical challenges and ensuring electoral integrity. Therefore, both logistic communication and election laws are integral in shaping the performance and reliability of electoral systems in Kenya.

Table 4.39: Analysis of Variance for the Moderating Role of Election Laws on Relationship between Logistic Communication and Performance of Electoral Systems in Kenya

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.066	1	26.066	146.451	.000 ^b
	Residual	19.222	108	.178		
	Total	45.288	109			
2	Regression	29.575	2	14.787	100.694	.000 ^c
	Residual	15.713	107	.147		
	Total	45.288	109			

a. Dependent Variable: Performance of electoral systems

b. Predictors: (Constant), Logistic communication

c. Predictors: (Constant), Logistic communication, Election laws

The coefficients table revealed the significant moderating role of election laws on the relationship between logistic communication and the performance of electoral systems in Kenya. In Model 1, logistic communication shows a strong unstandardized coefficient (B) of 0.431 and a high standardized coefficient (Beta) of 0.759, with a t-value of 12.102 ($p < 0.001$). This indicates that effective logistic communication significantly influences electoral system performance. Model 2, which incorporates election laws as an additional predictor, adjusts the constant to 1.771 and slightly reduces the coefficient for logistic communication to 0.278 (Beta = 0.489), while introducing a new coefficient for election laws at 0.302 (Beta = 0.387). Both predictors maintain significant t-values (6.179 and 4.888 respectively, $p < 0.001$), demonstrating that election laws strengthen the relationship between logistic communication and electoral outcomes. This finding is supported by scholarly literature such as Ehimare *et al.* (2023) and Panjaitan *et al.* (2024), which discuss how legal frameworks enhance communication effectiveness in electoral logistics. Legal cases like Maina Kiai v. Attorney General (2018) and Bush v. Gore (2000) further underscore the critical role of legal structures in ensuring transparent and efficient electoral processes by mitigating communication challenges and logistical errors. Thus, both logistic communication and election laws play pivotal roles in shaping the performance and reliability of electoral systems in Kenya.

Table 4.40: Coefficients for the Moderating Role of Election Laws on Relationship between Logistics Communication and Performance of Electoral Systems in Kenya

Coefficients^a					
Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	2.396	.132		18.147
	Logistics communication	.431	.036	.759	12.102
2	(Constant)	1.771	.175		10.097
	Logistics communication	.278	.045	.489	6.179
	Election laws	.302	.062	.387	4.888

a. Dependent Variable: Performance of electoral systems

4.6.3 Analysis of the Overall Model

Analysis of the Overall Model sought to present and expand the results on the joint role of all the independent variables and moderating variable on the dependent variable. In this section the findings are discussed focusing on the main objectives of this study which sought the relationship between logistics management practices and performance of electoral systems in Kenya. To achieve this, Logistics communication, Logistics planning, Transport management, Inventory management practices against the performance of electoral systems in Kenya as assessed by the Reliability, Voter turnout, Consistency and Credibility. Also, the study insisted to look at moderating role of election laws on relationship between logistics management practices and performance of electoral systems in Kenya. The study computes the results of multiple linear regression model was adopted to test the significance of the role of the independent variable on the dependent variable. Hence the overall model for the study was

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \dots \dots \dots \text{Multiple Linear Régression Model without moderator variable}$$

$$Y = \beta_0 + \beta_1 X_1 * M + \beta_2 X_2 * M + \beta_3 X_3 * M + \beta_4 X_4 * M + \epsilon \dots \dots \dots \text{Multiple Linear Régression Model with moderator variable}$$

Y= Performance of Electoral Systems in Kenya.

β_0 =Constant

X_1 = Logistics planning Practices

X_2 = Inventory management practices

X_3 = Transportation management practices

X_4 = Logistics communication

M=Election Law

$\beta_1, \beta_2, \beta_3, \beta_4$ = Regression co-efficient

ε =Error term

4.6.3.1 Inferential Analysis of the Overall Model

Bell, Bryman, and Harley, (2022) argued that if the study seeks to analyses the data beyond means and standard deviations for example if there is need to examine the relationship between variables then bivariate analysis such as correlation and regression analysis are the most appropriate. Thus, the researcher applied Pearson correlation analysis to examine the strength of the relationship between Performance of Electoral Systems in Kenya and logistics management practices. Moreover, regression analysis was used to examine the nature of the relationship as well as test the hypothesis of the study. The level of significance was tested at 5% and according to Ratten,(2023) with this significance level then the researcher has 95% chances of making the correct decision that there exists a significant relationship between dependent and independent variable.

The regression model summary illustrates significant insights into the factors influencing the performance of electoral systems across African countries. Model 1, which includes logistic communication, logistic planning, transport management, and inventory management practices as predictors, shows a high R Square of 0.825, indicating that these variables collectively explain 82.5% of the variance in electoral system performance. This model is robust, as evidenced by a substantial F Change of 124.013 ($p < 0.001$). Model 2 introduces election laws as an additional predictor, resulting in a marginal increase in R Square to 0.828, although this change is not statistically significant (F Change = 1.440, $p = 0.233$). This suggests that while election laws contribute slightly to the model's explanatory power, their impact is

less pronounced compared to logistic communication and management practices. Scholarly literature supports these findings: studies by Ehimare *et al.* and Panjaitan *et al.* emphasize the critical role of effective logistics and communication in electoral processes across diverse contexts. Legal cases such as Maina Kiai v. Attorney General (2018) and Bush v. Gore (2000) underscore the importance of legal frameworks in addressing logistical challenges and ensuring electoral integrity. Therefore, while logistic practices play a central role, integrating robust election laws further enhances the overall effectiveness and fairness of electoral systems in Africa.

Table 4.41: Overall Model Regression Model

Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.908 ^a	.825	.819	.27450	.825	124.013	4	105	.000	
2	.910 ^b	.828	.819	.27392	.002	1.440	1	104	.233	2.243
a. Predictors: (Constant), Logistic communication, Logistic planning, Transport management, Inventory management practices										
b. Predictors: (Constant), Logistic communication, Logistic planning, Transport management, Inventory management practices, Election laws										
c. Dependent Variable: Performance of electoral systems										

The ANOVA table provided significant insights into the predictors influencing the performance of electoral systems across African nations. In Model 1, which included logistic communication, logistic planning, transport management, and inventory management practices as predictors, the regression sum of squares is 37.377, with a mean square of 9.344 and a high F-value of 124.013 ($p < 0.001$). This indicated that these variables collectively explain a substantial amount of variance in electoral system performance. The addition of election laws in Model 2 slightly altered the model, resulting in a decrease in the mean square to 7.497 and a corresponding F-value of 99.914 ($p < 0.001$). Despite the decreased in mean square, the overall model remains highly significant, suggesting that election laws contribute to the explanatory power of the model, albeit marginally. This finding is supported by scholarly literature: studies by Ehimare *et al.* and Panjaitan *et al.* emphasize the pivotal role of logistical and communication practices in electoral processes, while legal cases like Maina Kiai v. Attorney General (2018) and Bush v. Gore (2000) underscore the importance of legal frameworks in addressing logistical challenges

and ensuring electoral integrity. Therefore, integrating robust election laws alongside effective logistical practices enhances the overall performance and fairness of electoral systems in Africa

Table 4.42: Analysis of Variance for the Moderating Role of Election Laws on Relationship Between

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.377	4	9.344	124.013	.000 ^b
	Residual	7.912	105	.075		
	Total	45.288	109			
2	Regression	37.485	5	7.497	99.914	.000 ^c
	Residual	7.803	104	.075		
	Total	45.288	109			

a. Dependent Variable: Performance of electoral systems

b. Predictors: (Constant), Logistic communication, Logistic planning, Transport management, Inventory management practices

c. Predictors: (Constant), Logistic communication, Logistic planning, Transport management, Inventory management practices, Election laws

The coefficients table highlights the nuanced influence of logistics management practices and election laws on the performance of electoral systems across African countries. In Model 1, logistic planning, inventory management practices, transport management, and logistic communication collectively demonstrated significant effects. Logistic planning had an unstandardized coefficient of 0.129 (Beta = 0.139, $t = 2.888$, $p = 0.005$), indicating a modest but positive impact on electoral performance. Inventory management practices showed a substantial effect with an unstandardized coefficient of 0.589 (Beta = 0.654, $t = 9.265$, $p < 0.001$), suggesting that effective inventory management significantly enhanced electoral outcomes. Transport management and logistic communication also contributed positively, albeit with smaller coefficients (0.108 and 0.069 respectively). In Model 2, the addition of election laws slightly adjusted the coefficients: logistic planning decreased to 0.111 (Beta = 0.120, $t = 2.371$, $p = 0.020$), while inventory management practices, transport management, and logistic communication retained their significance. Notably, election laws introduced a new dimension with a coefficient of 0.061 (Beta = 0.079, $t = 1.200$, $p = 0.033$), indicating a marginal but still statistically significant impact on electoral performance. This finding is consistent with scholarly literature that emphasizes how legal frameworks, as seen in cases across Africa, such as Maina

Kiai v. Attorney General (2018) and Bush v. Gore (2000), play a crucial role in mitigating logistical challenges and ensuring fair electoral processes. Therefore, while effective logistics management practices are essential, integrating robust election laws further enhances the integrity and efficiency of electoral systems in African contexts.

$$\text{Performance of electoral systems} = 0.648 + (0.111X_1 + 0.561X_2 + 0.107X_3 + 0.056X_4) 0.061 + \varepsilon$$

Table 4.43: Coefficients for the Moderating Role of Election Laws on Relationship between Logistics Management Practices and Performance of Electoral Systems in Kenya

Coefficients^a								
Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	Collinearity Statistics	
		B	Std. Error				Tolerance	VIF
1	(Constant)	.674	.198		3.398	.001		
	Logistic planning	.129	.045	.139	2.888	.005	.722	1.385
	Inventory management practices	.589	.064	.654	9.265	.000	.334	2.993
	Transport management	.108	.063	.104	1.713	.000	.451	2.219
	Logistic communication	.069	.038	.121	1.812	.000	.372	2.691
2	(Constant)	.648	.199		3.251	.002		
	Logistic planning	.111	.047	.120	2.371	.020	.651	1.536
	Inventory management practices	.561	.067	.623	8.323	.000	.296	3.384
	Transport management	.107	.063	.104	1.709	.040	.451	2.219
	Logistic communication	.056	.039	.099	1.433	.040	.346	2.893
	Election laws	.061	.051	.079	1.200	.033	.384	2.602

a. Dependent Variable: Performance of electoral systems

4.7 Qualitative Analysis

In this study, qualitative interviews and document analysis were used to obtain various perspectives on the study. According to Frost, (2021), thematic analysis is

used to identify, analyze, and report themes within the data. The data collected through interviews were analyzed in a three-stage procedure as suggested in the literature by several scholars (Creswell, 2014) which involves: transcribing the analysis data, reducing the data into themes through coding and representing the data. The conceptual framework for the thematic analysis for this study was guided by the positions of Hennink, Hutter, & Bailey, (2020). According to Gaber, (2020). patterns are identified through a rigorous process of data familiarization, data coding, and theme development and revision

4.7.1 Logistics Planning Practices Themes

A question was posed to the respondents on the role of logistics planning practices which contribute significantly on the performance of electoral systems in Kenya and the themes that resulted from this question are presented in Table 4.45. Table 4.45 on Logistics Planning Practices from the study provides a comprehensive view of the critical themes and challenges associated with logistics planning in electoral systems across African countries. The open coding reveals themes such as ensuring timely and efficient delivery of materials and personnel, accuracy in inventory management using technologies like barcoding and RFID tagging, and ensuring safety and security through measures like armored vehicles and GPS tracking. These practices are crucial, as highlighted by scholarly literature and election petitions cases. For instance, cases like *Maina Kiai v. Attorney General* (2018) underscore the importance of secure logistics to prevent tampering and delays, which can impact electoral integrity. Challenges identified in the axial coding include inadequate resources, limited infrastructure, security concerns, and unpredictable weather conditions, which were evident in the logistics of elections in several African nations. Effective logistics planning not only supports transparency and accountability through accurate information provision but also addresses accessibility for voters with disabilities, using innovations like digital mapping tools and mobile apps. Best practices identified include the use of advanced technologies, optimization of transportation routes, collaboration with stakeholders, and environmental considerations, all contributing to efficient electoral logistics management. Overall, integrating robust logistics planning practices with stringent

election laws enhances the credibility and efficiency of electoral processes across Africa, as reflected in the ANOVA results that highlight the significant impact of these practices on electoral system performance.

Table 4.44: Logistics Planning Practices Themes

Open coding	Axial coding	Selective Themes
Importance of logistics planning	1.1. Ensuring timely delivery of materials 1.2. Ensuring efficient delivery of personnel and services 1.3. Ensuring accuracy of delivery	Safety and security of election materials and personnel are critical, and measures such as the use of armored vehicles, security personnel,
Challenges in logistics planning	2.1. Inadequate resources 2.2. Limited infrastructure 2.3. Security concerns 2.4. Unpredictable weather conditions	Logistics planning is crucial for the success of the electoral system in Kenya.
Accuracy of inventory and tracking of election materials	3.1. Use of barcoding 3.2. Use of RFID tagging 3.3. Use of other tracking technologies	Logistics planners face various challenges, such as inadequate resources and unpredictable weather conditions.
Safety and security of election materials and personnel	4.1. Use of armored vehicles 4.2. Deployment of security personnel 4.3. Implementation of GPS tracking systems	Accurate inventory and tracking of election materials are crucial for the electoral system's success, and various technologies are used for this purpose.
Deployment of election personnel to polling stations	5.1. Use of digital mapping tools 5.2. Use of communication technologies 5.3. Use of logistics management systems	
Best practices in logistics planning	6.1. Use of advanced technologies 6.2. Optimization of transportation routes 6.3. Collaboration with stakeholders 6.4. Integration of environmental considerations	
Contribution of logistics planning to transparency and accountability	7.1. Providing accurate and timely information 7.2. Ensuring integrity of logistics chain	
Accessibility of polling stations to voters with disabilities	8.1. Provision of ramps 8.2. Provision of tactile ballots 8.3. Provision of Braille guides 8.4. Training of election personnel on disability-inclusive practices	

Open coding	Axial coding	Selective Themes
Innovations in logistics planning	9.1. Use of mobile apps for logistics management	
	9.2. Integration of social media for communication	
	9.3. Implementation of smart logistics systems	
Risk management in logistics planning	10.1. Conducting risk assessments	
	10.2. Developing contingency plans	
	10.3. Ensuring availability of backup resources	
Support for the participation of underrepresented groups	11.1. Ensuring accessibility of polling stations	
	11.2. Availability of inclusive materials	
	11.3. Sensitivity of election personnel to diversity issues	
Prevention of theft or loss of election materials	12.1. Use of tamper-evident seals	
	12.2. Implementation of security protocols	

4.7.2 Inventory Management Practices Themes

A question was posed to the respondents on the role of inventory management practices which contribute significantly on the performance of electoral systems in Kenya and the themes that resulted from this question are presented in Table 4.48. Table 4.46 on Inventory Management Practices Themes presents a detailed analysis of the essential aspects and challenges associated with managing election materials across various African electoral systems. The open coding reveals key themes such as the importance of inventory management in ensuring the availability and timely delivery of election materials and equipment, crucial for the success of elections. Scholarly literature and election petitions cases support this by emphasizing the significance of adequate and well-managed inventories in preventing logistical bottlenecks and ensuring transparency. Challenges identified in the axial coding include inadequate resources, poor data management, and inaccurate forecasting, which have been documented in cases like *Bush v. Gore* (2000) and *Chamisa v. Mnangagwa* (2018), where logistical failures affected election outcomes. Ensuring accuracy through barcode scanning and RFID technology, as highlighted in the literature, supports accountability and transparency in electoral processes. Best

practices such as the use of technology, regular auditing of inventory records, and optimization of storage capacity are critical innovations discussed in scholarly works like Panjaitan *et al.* (2024) and Adoki *et al.* (2023), aiming to improve inventory management efficiency. These practices are crucial for managing risks associated with shortages or excess inventory, supporting inclusive participation, and preventing the expiration or inefficient disposal of election materials, as outlined in Ugwuibe *et al.* (2020) and other studies. Overall, integrating robust inventory management practices with innovative technologies and stringent regulatory frameworks enhances the integrity and efficiency of electoral processes across Africa, as reflected in the ANOVA findings demonstrating the impact of these practices on electoral system performance.

Table 4.45: Inventory Management Practices Themes

Open coding	Axial coding	Selective Themes
Importance of inventory management	1.1. Availability of election materials and equipment	Importance of inventory management for successful elections
Challenges faced by inventory managers	1.2. Timeliness of delivery 2.1. Inadequate resources 2.2. Poor data management	Challenges faced by inventory managers in the electoral system
Accuracy of inventory records	2.3. Inaccurate forecasting 3.1 Barcode scanning	Ensuring transparency and accountability through inventory management
Prevention of loss or theft of election materials	3.2 RFID technology 4.1 Tamper-evident seals 4.2 Security protocols	Optimization of inventory management practices for efficient storage and distribution of election materials
Optimization of storage and distribution	4.3 Deployment of security personnel 5.1 Demand forecasting 5.2 Analysis of storage capacity	Support for inclusive participation in elections through the availability of materials for voters with disabilities
Best practices in inventory management	5.3 Monitoring of lead times 6.1 Use of technology 6.2. Optimization of storage capacity	Innovations in inventory management for the electoral system
Transparency and accountability	6.3 Regular auditing of inventory records 7.1 Timely and accurate information	Managing risk of shortages or excess inventory
Inclusive materials for voters with disabilities	8.1 Ordering and distribution of materials	Preventing the expiration of election materials and efficient disposal of unused or expired materials
Innovations in inventory management	9.1 Mobile apps for inventory management	
Risk management	9.2. Smart inventory systems 10.1Demand forecasting 10.2Inventory optimization 10.3 Contingency plans	
Support for participation of women, youth, and minorities	11.1Availability of inclusive materials	
Prevention of expiration of election materials	12.1. Regular inventory audits	
Efficient disposal of unused or expired materials	12.2. Use of expiration date labels	
Improvement of accuracy and timeliness of election results	13.1 Established disposal procedures and regulations 14.1 Availability of election materials and equipment 1.4.2Timely and accurate information on the movement of materials	

4.7.3 Transportation Management Practices Themes

A question was posed to the respondents on the role of transportation management practices which contribute significantly on the performance of electoral systems in Kenya and the themes that resulted from this question are presented in Table 4.49. Table 4.47 on Transportation Management Practices Themes provides insights into the critical role of transportation in the electoral system of Kenya, supported by scholarly literature and election petitions cases. Open and axial coding reveal several key themes, beginning with the challenges associated with transporting election materials, which have been extensively documented in cases such as *Maina Kiai v. Attorney General* (2018) and *Akufo-Addo v. Mahama* (2020), highlighting logistical failures impacting electoral integrity. Security concerns related to the transportation of election materials underscore the importance of robust transportation management practices, as discussed in *Ehimare et al.* (2023) and *Marcos v. Robredo* (2016), emphasizing the need for secure transportation measures. Ensuring timely delivery during emergency situations, facilitated by technology, is crucial, as outlined in *Panjaitan et al.* (2024) and *Adoki et al.* (2023), which detail the role of technology in enhancing transportation management efficiency. Evaluating the effectiveness of these practices, including cost reduction measures and legal compliance, as seen in *Ugwuibe et al.* (2020) and scholarly discussions, further supports the need for comprehensive transportation strategies. Best practices involving stakeholder engagement and regulatory adherence are pivotal in optimizing transportation logistics for electoral processes, contributing to the overall reliability and fairness of elections, as reflected in the ANOVA findings assessing the impact of transportation management on electoral system performance

Table 4.46: Transportation Management Practices Themes

Open coding	Axial coding	Selective Themes
Transportation management practices		
Electoral system in Kenya		
Challenges in transportation of election materials	Challenges in transportation of election materials	Importance of transportation management in the electoral system in Kenya
Security of election materials	Security of election materials	Challenges in transportation management of election materials
Timely delivery of election materials	Timely delivery of election materials	Measures to ensure security and timely delivery of election materials
Emergency situations during transportation	Emergency situations during transportation	
Technology in transportation management	Technology in transportation management	Role of technology in transportation management in the electoral system in Kenya
Effectiveness of transportation management practices	Effectiveness of transportation management practices	Evaluation of transportation management practices in the electoral system in Kenya
Cost reduction measures	Cost reduction measures	Cost reduction measures in transportation management
Legal and regulatory compliance	Legal and regulatory compliance	Compliance with legal and regulatory requirements in transportation management
Best practices in transportation management	Best practices in transportation management	Best practices in transportation management for the electoral system in Kenya
Stakeholder engagement		

4.7.4 Logistics Communication Themes

A question was posed to the respondents on the role of logistics communication which contribute significantly on the performance of electoral systems in Kenya and the themes that resulted from this question are presented in Table 4.48. Table 4.48 on Logistics Communication Themes highlights the critical aspects of communication practices within the electoral system of Kenya, supported by scholarly literature and election petitions cases. Open and axial coding of the themes reveal that effective logistics communication is crucial for ensuring the coordination and synchronization necessary for successful electoral processes. This importance is emphasized in scholarly works such as those by Panjaitan *et al.* (2024) and Adoki *et al.* (2023), which discuss the role of communication protocols and training in enhancing logistical coordination. Challenges in logistics communication, including technology

limitations and language barriers, have been documented in cases like Maina Kiai v. Attorney General (2018), illustrating how these factors can impact the transparency and efficiency of electoral logistics. Ensuring effective communication between stakeholders, supported by security measures and compliance with regulations as observed in Marcos v. Robredo (2016), is essential for monitoring and measuring key performance indicators during elections. The role of technology in enhancing logistics communication practices, alongside compliance with legal requirements and best practices such as collaboration with stakeholders, is crucial for optimizing communication strategies within electoral frameworks. This comprehensive approach to logistics communication is further validated by ANOVA findings, which assess the impact of communication practices on the overall performance of electoral systems, underscoring its integral role in electoral integrity and transparency.

Table 4.47: Logistics Communication Themes

Open coding	Axial coding	Selective Themes
Experience in logistics communication practices		
Importance of logistics communication in electoral system	Communication protocols and training	Importance of coordination and synchronization in logistics communication
Challenges encountered in logistics communication practices	Technology and real-time communication	Impact of language barriers and infrastructure on logistics communication
Ensuring effective communication between stakeholders	Security measures and compliance with regulations	Monitoring and measuring key performance indicators
Security of communication channels during electoral process	Collaboration with other stakeholders	Building strong relationships with stakeholders
Measuring effectiveness of logistics communication practices		
Role of technology in logistics communication practices		
Compliance with legal and regulatory requirements		
Best practices in logistics communication		
Working with other stakeholders		

4.7.4 Moderating Role of Election Laws on Logistics Management Practices and the Performance of Electoral Systems in Kenya Themes

A question was posed to the respondents on the moderating role of election laws on logistics management practices and the performance of electoral systems in Kenya and the themes that resulted from this question are presented in Table 4.49. Table 4.51 on the Role of Election Laws on Logistics Management Practices and The Performance of Electoral Systems elucidates the multifaceted relationship between regulatory frameworks, logistics management practices, and electoral performance in Kenya, drawing from both scholarly literature and election petitions cases. The open and axial coding process highlights that election laws play a pivotal role in shaping logistics management practices by providing specific regulatory frameworks for the procurement, transportation, and distribution of election materials. This regulatory guidance is crucial for ensuring timely, efficient, and transparent logistics operations, as emphasized by Ehimare *et al.* (2023) and Ugwuibe *et al.* (2020). Challenges in compliance with these laws, documented in cases like Bush v. Gore (2000), underscore the importance of robust legal frameworks in safeguarding the credibility of the electoral process through effective logistics management. Moreover, election laws are instrumental in protecting election materials from tampering and damage, a critical aspect supported by the need for specific and detailed guidance on logistics management practices as noted in recent developments and innovations discussed by Panjaitan *et al.* (2024). The interconnectedness between logistics management practices and election laws requires continuous monitoring, audits, and transparent communication with stakeholders, ensuring that logistics operations adhere to legal requirements and contribute positively to the overall performance and integrity of electoral systems.

Table 4.48: Role of Election Laws on Logistics Management Practices and the Performance of Electoral Systems Themes

Open coding	Axial coding	Selective Themes
Regulatory framework Roles and responsibilities of stakeholders Legal framework for procurement, transportation, and distribution of election materials Recruitment and training of personnel Timely, efficient, and transparent logistics management Credibility of the electoral process Interconnectedness of logistics management practices and election laws Protection of election materials from tampering and damage Specific and detailed guidance on logistics management practices Use of technology Best practices for personnel training and capacity building Latest developments and innovations in logistics management and technology Regular audits and inspections Open and transparent communication with stakeholders Monitoring of logistics management practices	Election laws play a critical role in shaping logistics management practices in the electoral system in Kenya Effective logistics management practices can help to ensure a successful election Election laws provide the regulatory framework for logistics management practices Election laws moderate logistics management practices to ensure compliance Challenges in implementing logistics management practices in compliance with election laws in Kenya Election laws can be improved to better moderate logistics management practices Measures to ensure compliance with election laws in logistics management practices in the electoral system in Kenya	The role of election laws in logistics management practices The impact of election laws on logistics management practices Challenges in implementing logistics management practices in compliance with election laws Improving election laws to better moderate logistics management practices Ensuring compliance with election laws in logistics management practices

4.7.5 Measure the Performance of Electoral Systems in Kenya Themes

A question was posed to the respondents on the measure the performance of electoral systems in Kenya: and the themes that resulted from this question are presented in Table 4.50. Table 4.50, focused on the Measurement of the Performance of Electoral Systems in Kenya, underscored key themes derived from both scholarly literature and election petitions cases, provided a comprehensive assessment of electoral

processes in the country. Fairness and transparency of recent elections were central, influenced by factors such as the independence and impartiality of the electoral commission, as discussed in the cases of *Chamisa v. Mnangagwa* (2018) and scholarly works by Adoki *et al.* (2023). The efficiency and accessibility of voter registration and voting processes were crucial for ensuring the accuracy and transparency of vote counting, highlighted in studies by Panjaitan *et al.* (2024). Timeliness in announcing election results and the effectiveness of electoral dispute resolution mechanisms, supported by Ugwuibe *et al.* (2020), were also critical indicators. Challenges such as incidents of electoral fraud, irregularities, and logistical issues in transportation, examined through cases like *Maina Kiai v. Attorney General* (2018), underscored the need for improved coordination and communication among stakeholders. Enhancing logistics arrangements and public communication about the electoral process, as suggested in recent literature, are essential for fostering public trust and improving future elections in Kenya. Therefore, this table serves to evaluate various dimensions of electoral system performance, providing insights into strengths, challenges, and avenues for enhancement in Kenya's electoral processes.

Table 4.49: Measurement of the Performance of Electoral Systems in Kenya
Themes

Open coding	Axial coding	Selective Themes
Fairness and transparency of recent elections in Kenya Independence and impartiality of the electoral commission Efficiency and effectiveness of voter registration process Ease and accessibility of the voting process Accuracy and transparency of the vote counting process	Accuracy and transparency of the vote counting process Accessibility and ease of the voting process	Fairness and transparency of the electoral process Efficiency and effectiveness of the electoral process
Timeliness and transparency of announcements of election results	Independence and impartiality of the electoral commission	Security and safety of the electoral process
Incidents of voter intimidation or harassment	Incidents of irregularities, fraud, and intimidation	Coordination and communication among stakeholders in the electoral process
Incidents of electoral fraud or irregularities	Timeliness and transparency of the announcement of election results	Suggestions for improving future elections in Kenya
Efficiency and effectiveness of electoral disputes resolution process Measures taken to ensure security of electoral process	Effectiveness of the electoral dispute's resolution process Challenges faced in the transportation of polling materials	
Incidents of violence or security breaches during the electoral process Challenges faced in the transportation of polling materials	Effectiveness of logistics arrangements for the electoral process Communication of the electoral process to the public	
Efficiency and effectiveness of coordination between electoral commission and logistics providers Incidents of miscommunication or lack of coordination between electoral commission and logistics providers Effectiveness of communication of the electoral process to the public Overall satisfaction with the logistics arrangements for the electoral process Suggestions for improving logistics arrangements for future elections in Kenya		

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary of findings, conclusions and recommendations. The study sought to examine the relationship between logistics management practices through determining Logistics Planning, Inventory Management, Transportation Management, Logistic Communication and Performance of Electoral System. In the summary of findings, the results and remarks for each of the hypothesis in the study were presented for the four research objectives. The conclusions presented in this section were guided by the research objectives and informed by the findings, analysis, interpretation and discussions in the study. Based on the conclusions made, the contribution of the study to knowledge was examined. Recommendations based on the results for policy and practice and for methodology as well as suggestions for further research were made.

5.2 Summary of Major Findings

The current study stemmed from the realization of the research problem in literature on relationship between logistics management practices and performance of electoral systems in Kenya. Empirically most of the studies on the role of logistics management practices have been skewed towards use of primary data and only specific logistics management practices on Logistics Planning, Inventory Management, Transportation Management and Logistic Communication had been evaluated. Among the several studies which had been done in the Kenyan perspective majority have not examined the causal joint relationship between logistics management practices and performance of electoral systems. Consequently, the researcher's primary purpose was to examine the relationship between logistics management practices and performance of electoral systems in Kenya. Further, the study sought to test four hypotheses; Logistics Planning, Inventory Management, Transportation Management and Logistic Communication has no significant role on performance of electoral systems in Kenya and election laws has no significant

moderating relationship between logistics management practices and the performance of electoral systems in Kenya

In order to meet the overall objective and test the study hypotheses the study adopted a longitudinal research design. The target population in this study was 373 Commission Secretary/Chief Executive Officer (CS/CEO), Deputy Commission Secretary (DCS), Directors, Managers, County Election Managers, Constituency Election Coordinators. Stratified sampling technique was used to select a sample of 121 Commission Secretary/Chief Executive Officer (CS/CEO), Deputy Commission Secretary (DCS), Directors, Managers, County Election Managers, Constituency Election Coordinators. Primary data was collected from IEBC Staff and out of 121 questionnaires which were issued only 110 were completely filled and returned which yielded a response rate of 91%. The independent variables attributed examined in the study were Logistics Planning, Inventory Management, Transportation Management and Logistic Communication. Descriptive analysis such as frequency, percentage, mean and standard deviation were used to analyze the data which was summarized using figures and tables. Correlation analysis was used to examine the strength of the relationship between logistics management practices and the performance of electoral systems and regression analysis was used to examine the nature of the relationship between logistics management practices and the performance of electoral systems. Prior to regression analysis tests for various assumptions were carried out, for example, normality test was tested using skewness and kurtosis, heteroscedasticity was tested using Breusch-Pagan test, homoscedasticity was tested using Cameron and Trivedi's decomposition test, Multicollinearity was tested using Variance Inflation Factors (VIF) and tolerance values. On overall 91% of the variation in performance of electoral systems can be explained by Logistics Planning, Inventory Management, Transportation Management and Logistic Communication while the remaining percentage can be explained by other factors excluded in the model. The findings of the study demonstrated that logistics management practices have relationship on performance of electoral systems.

5.2.1 To Assess the Relationship between Logistics Planning Practices and Performance of Electoral Systems in Kenya

The study's primary objective was to investigate the impact of logistics planning practices on the performance of electoral systems in Kenya. The study collected responses from participants who provided their ratings on a five-point Likert scale, which were then summarized using percentages due to the ordinal nature of the data. The research examined various aspects of logistics planning and its connection to electoral performance, involving logistics plans for elections, logistics plan policies, synchronization of the election supply chain, and contingency planning policies.

The findings related to the presence of logistics plans for elections showed that 11.8% strongly disagreed, 24.5% disagreed, 25.5% were neutral, 27.3% agreed, and 10.9% strongly agreed. Similarly, regarding the existence of logistics plan policies, 5.5% strongly agreed, 3.6% agreed, 13.6% were neutral, 47.3% disagreed, and 30.0% strongly disagreed. For the concept of electoral logistics planning serving as a continuous process to link and synchronize the election supply chain, responses were as follows: 19.1% strongly agreed, 30.0% agreed, 21.8% were neutral, 22.7% disagreed, and 6.4% strongly disagreed. Concerning contingency planning policies, 21.8% strongly disagreed, 36.4% disagreed, 10.9% remained neutral, while 12.7% agreed, and 18.2% strongly agreed.

To test the research hypothesis that logistics planning practices had no significant role in the performance of electoral systems, a regression analysis was conducted. The analysis involved the examination of indicators such as logistics process mapping, logistics forecasting, logistics demand, and supply. The results revealed a moderate positive correlation ($R = 0.565$) between logistics planning and electoral system performance, with approximately 31.9% of the variance explained by logistic planning. The adjusted R Square value of 0.313 suggested that this relationship holds even when considering the number of predictor variables.

The model's fit was indicated by a standard error of the estimate of 0.53438, signifying the average difference between predicted and actual values. Change statistics showed a significant increase in variance explained (R Square change =

0.319) when including logistics planning as a predictor variable. The F Change value of 50.593 indicated a statistically significant improvement in model fit due to logistic planning, and the low Durbin-Watson statistic (2.457) confirmed the absence of significant autocorrelation in the residuals. The analysis of variance (ANOVA) underscored the model's significance, with a p-value less than 0.05, indicating that logistics planning practices significantly contributed to explaining electoral system performance. The regression coefficients demonstrated a positive relationship between logistics planning practices and electoral system performance, expressed as $Y = 1.927 + 0.525X_1$. This indicated that a unit change in logistics planning practices corresponded to a change of 0.525 in electoral system performance.

5.2.2 To Assess the Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya

The second objective of the study aimed to investigate the influence of inventory management practices on the performance of electoral systems in Kenya. The study involved participants who were asked to provide their opinions on various statements related to inventory management practices concerning election materials. The study assessed respondents' familiarity with inventory management practices for election materials. The results indicated that 19.1% strongly disagreed, 34.5% disagreed, 12.7% remained neutral, while 22.7% and 10.9% agreed and strongly agreed, respectively. Additionally, regarding the availability of an appropriately equipped warehouse with management systems for electoral technology, 7.3% strongly disagreed, 30.0% disagreed, 32.7% remained neutral, while 22.7% and 2.7% agreed and strongly agreed, respectively. The concept of inventory control of materials had 5.5% strongly disagree, 11.8% disagree, 12.7% remain neutral, and 44.5% and 25.5% agree and strongly agree, respectively. For cycle counting of voting materials before issuing, 10.9% strongly disagreed, 27.3% disagreed, 29.1% remained neutral, while 25.5% and 7.3% agreed and strongly agreed, respectively. Lastly, proper handling of voting materials had 10.0% strongly disagree, 20.9% disagree, 28.2% remained neutral, and 31.8% and 9.1% agree and strongly agree, respectively.

The study's second objective aimed to examine the relationship between inventory management practices and the performance of electoral systems in Kenya. The theoretical underpinning associated inventory management practices with electoral system performance, guided by indicators such as reliability, voter turnout, consistency, and credibility. Inventory management practices were assessed through indicators like voting material handling, inventory control, and packaging materials for delivery.

A null research hypothesis was formulated and tested: H_{02} : Inventory management practices have no significant role in the performance of electoral systems in Kenya.

The regression analysis results demonstrated a strong and significant role of inventory management practices on the performance of electoral systems. The R-squared values indicated that approximately 79% of the variation in electoral system performance was explained by inventory management practices. The adjusted R-squared value of 0.788 accounted for the number of predictors in the model.

The ANOVA results confirmed the significance of the regression model, indicating that inventory management practices significantly impacted the performance of electoral systems. The F-value of 405.528 was highly significant, suggesting that the predictor variable (inventory management practices) had a substantial effect on electoral system performance.

The regression coefficients provided insight into the relationship between inventory management practices and the performance of electoral systems. A unit change in inventory management practices corresponded to a change of 0.800 in electoral system performance. The t-values and significance levels highlighted the strong statistical significance of these coefficients.

The analysis of collinearity statistics indicated that there were no collinearity issues among the predictor variables, ensuring the robustness of the model.

5.2.3 To Assess the Relationship between Transportation Management Practices and Performance of Electoral Systems in Kenya.

The study's third objective aimed to investigate the impact of transport management practices on the performance of electoral systems in Kenya. The study collected data through respondents' opinions on various statements related to transport management practices. These statements included familiarity with transport management practices for election materials, the role of efficient transport management in distributing electoral materials to polling stations, the contribution of transport management practices to the safety and security of the electoral process, the necessity of efficient transport management for high voter turnout, and the submission of results using Biometric Voter Registration (BVR) machines.

The results indicated a range of responses. For instance, in terms of familiarity with transport management practices, a minority strongly disagreed (19.1%), while the majority disagreed (34.5%), and some remained neutral (12.7%), agreed (22.7%), or strongly agreed (10.9%). Similar patterns emerged in other statements, suggesting varying levels of agreement or disagreement with the importance of transport management practices for different aspects of the electoral system.

The study used regression analysis to explore the relationship between transport management practices and electoral system performance. The analysis revealed a moderately strong positive correlation (correlation coefficient of 0.712) between transport management and electoral system performance. Approximately 50.7% of the variation in electoral system performance was explained by transport management practices. This connection remained significant even after adjusting for the number of predictors.

Further analysis through analysis of variance showed that the regression model significantly affected the dependent variable (performance of electoral systems). The F-value of 110.870 indicated a substantial relationship between transport management and electoral system performance, with a statistically significant p-value of 0.000. This reinforced the notion that transport management practices play a significant role in explaining electoral system performance.

The coefficients derived from the regression model demonstrated that a unit change in transport management practices led to a corresponding change of 0.738 in electoral system performance. Both the constant term and the coefficient for transport management were statistically significant, reinforcing the strong relationship between the two variables. The standardized coefficient (Beta) of 0.712 indicated that transport management had a noteworthy positive impact on electoral system performance. Multicollinearity statistics were used to assess the relationship between predictors. The tolerance value of 1.000 and VIF of 1.000 indicated no multicollinearity issues with other predictors, specifically transport management.

5.2.4 To Assess the Relationship between Logistics Communication and Performance of Electoral Systems in Kenya

The fourth objective of this study was to examine the impact of logistics communication practices on the performance of electoral systems in Kenya. Respondents were surveyed to rate their opinions on various statements related to logistics communication practices and their role in general election performance. The study found that regarding the statement "Communication is a strategy that is useful in General Election Performance," 42.2% of respondents agreed, 28.4% were neutral, 10.2% strongly agreed, 16.5% disagreed, and 2.6% strongly disagreed. Similarly, for the statement "Logistics communication effective has promoted changes required in General Election Performance," 15.5% strongly agreed, 27.7% agreed, 28.1% were neutral, 26.1% disagreed, and 2.6% strongly disagreed. The research also explored whether the election body tracks communication costs to determine if savings from turnover outweigh program costs. Results showed that 37.3% strongly agreed, 23.1% agreed, 20.5% were neutral, 15.8% disagreed, and 3.3% strongly disagreed. In terms of communication network quality during election periods, 28.4% strongly agreed, 37.6% agreed, 19.5% were neutral, 11.2% disagreed, and 3.3% strongly disagreed. Additionally, the study investigated the consistency of communication networks, with 14.9% strongly agreeing, 53.3% agreeing, 19.9% being neutral, 8.6% disagreeing, and 3.3% strongly disagreeing. The study also examined the extent to which communication needs assessment during the election period was necessary. Results showed that 9.2% strongly agreed, 27.1% agreed,

34.7% were neutral, 24.1% disagreed, and 5.0% strongly disagreed. Lastly, the research investigated the need for arrangements with telecommunications providers to ensure service availability on urgent call throughout voting day. Results revealed that 29.0% strongly agreed, 38.0% agreed, 21.8% were neutral, 7.9% disagreed, and 3.3% strongly disagreed. The study used regression analysis to evaluate the relationship between logistics communication and the performance of electoral systems. The correlation coefficient (R) was 0.759, indicating a moderately strong positive correlation between logistics communication and performance. The R-squared value (Coefficient of Determination) was 0.576, meaning that around 57.6% of the variability in performance can be explained by logistics communication. The ANOVA analysis confirmed the significant role of logistics communication on electoral system performance. The F-value of 146.451 with a significance level of 0.000 indicated strong evidence to reject the null hypothesis. The regression coefficients showed that a unit change in logistics communication corresponded to a change of 0.431 in performance. Both the constant term and the coefficient for logistics communication were statistically significant. Collinearity statistics suggested no issues of multicollinearity.

5.2.5 Moderating Role of Election Laws on Relationship between Logistics Management Practices and Performance of Electoral Systems in Kenya

The fifth specific objective sought to establish the moderating role of election laws on relationship between logistics management practices and performance of electoral systems in Kenya. This objective was tested under four hypotheses, namely;

H_{05i}: Election laws have no significant moderating relationship between logistics planning practices and performance of electoral systems in Kenya.

The results revealed a positive and significant relationship between Logistics planning practices and performance of electoral systems in Kenya after the moderator interaction (election laws* Logistics planning practices) was included in the model.

H_{05ii}: Election laws has no significant moderating relationship between inventory management practices and performance of electoral systems in Kenya.

The results revealed a positive and significant relationship between Inventory management practices and performance of electoral systems in Kenya after the moderator interaction (election laws* Inventory management practices) was included in the model.

H_{05iii}: Election laws have no significant moderating relationship between transportation management practices and performance of electoral systems in Kenya.

The results revealed a positive and significant relationship between Transportation management practices and performance of electoral systems in Kenya after the moderator interaction (election laws* Transportation management practices) was included in the model.

H_{05iv}: Election laws have no significant moderating relationship between logistics communication and performance of electoral systems in Kenya.

The results revealed a positive and significant relationship between Logistics communication and performance of electoral systems in Kenya after the moderator interaction (election laws* Logistics communication) was included in the model.

5.3 Conclusion of the Study

Herein are the conclusions drawn from the study;

5.3.1 Relationship between Logistics Planning Practices and Performance of Electoral Systems in Kenya

In conclusion, the findings of the study offer compelling evidence to support the notion that logistics planning practices exert a significant influence on the performance of election systems in Kenya. The findings of this study highlight the significance of efficient logistics planning in ensuring the effectiveness of election

processes, as evidenced by the positive correlation, significant improvements in model fit, and coefficients. The consequences of these findings are relevant for electoral authorities and policymakers that aim to improve the dependability, participation rate, uniformity, and trustworthiness of election systems through the use of strategic logistical planning.

5.3.2 Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya.

In conclusion, the results of the study indicate that the implementation of efficient inventory management strategies significantly influences the performance outcomes of election systems in Kenya. The findings of this study highlight the significance of careful management of election materials in improving the performance of electoral systems, as evidenced by the positive correlation, significant model fit, and strong coefficients. These findings have practical significance for electoral institutions and policymakers seeking to enhance the dependability, uniformity, and legitimacy of electoral procedures through the implementation of strategic inventory management strategies. Additional investigation can explore the precise processes through which inventory management methods exert their impact on the performance of voting systems.

5.3.3 Relationship between Transportation Management Practices and Performance of Electoral Systems in Kenya

In con, the research underscored the crucial importance of implementing efficient transportation management techniques to improve the efficacy of election processes in Kenya. The results provided useful insights for policymakers and electoral organizations, highlighting the necessity of enhancing logistics and transportation operations to achieve greater efficiency and dependability in electoral procedures. Nevertheless, it is advisable to do further study in order to investigate additional elements that may impact the effectiveness of voting systems and verify the results obtained from this model.

5.3.4 Relationship between Logistics Communication and Performance of Electoral Systems in Kenya

The study concluded that the performance of electoral systems in Kenya is anticipated to grow for every unit increase in logistics communication. These findings of the study indicate that the communication patterns within logistics have a substantial impact on the performance of voting systems in Kenya. The findings indicated that the implementation of effective communication techniques had a favorable influence on multiple dimensions of election performance, including but not limited to, dependability, voter participation, coherence, and trustworthiness. The study underscored the significance of upholding effective communication networks and evaluating communication requirements during the electoral cycle.

5.4 Recommendations of the Study

The recommendations outlined below are suggested by the study:

5.4.1 Relationship between Logistics Planning Practices and Performance of Electoral Systems in Kenya

The study's findings and examination of the significance of logistics planning strategies on the performance of Kenyan electoral systems suggest several recommendations that can be made to enhance their effectiveness. One potential recommendation is to implement robust logistics planning procedures that aim to optimize resource allocation, minimize bottlenecks, and eradicate avoidable delays within the electoral process. The successful execution of an election necessitates the implementation of efficient strategies for material, staff, and technology management. This comprehensive approach ensures the seamless progression of all stages of the electoral process, minimizing the occurrence of significant disruptions or errors. The second proposal aims to advocate for the prioritization of voters' preferences and experiences by emphasizing the need for logistics planning to focus on creating a voting environment that is user-friendly and accessible. The implementation of well-structured polling locations, unambiguous voting guidelines, and convenient availability of relevant information are crucial components for an

effective electoral process. One crucial recommendation is the establishment of a highly responsive logistical communication system that possesses the ability to swiftly adapt to unforeseen obstacles or emergencies that may arise throughout the election period. This system would play a pivotal role in ensuring the smooth and efficient execution of electoral processes. The successful execution of a project often necessitates the implementation of various strategies, such as the development of contingency plans, the establishment of effective communication channels with all relevant stakeholders, and the ability to adapt logistical arrangements in a timely manner. The fourth proposal entails the development of cost-effective logistics planning approaches that aim to minimize unnecessary expenses while upholding the quality and efficiency of the electoral process. In order to optimize operational efficiency and resource utilization, it is imperative to consider the implementation of various strategies. These strategies may include the centralization of procurement processes, the streamlining of transportation routes, and the prevention of overstocking or resource waste. By adopting these measures, organizations can enhance their overall performance and achieve significant cost savings. The fourth proposal entails the prioritization of maintaining high-quality election materials, equipment, and facilities within logistical planning methods. The implementation of regular checks and maintenance routines is crucial in mitigating technological faults and ensuring a seamless voting process that yields precise and reliable results. In conclusion, it is strongly recommended that the implementation of logistics planning systems be prioritized in order to effectively maintain a seamless and uninterrupted flow of operations during the entirety of the electoral process. The successful execution of elections necessitates the implementation of efficient supply chains, ensuring the timely distribution of election materials, and fostering effective communication throughout the various stages of the electoral process.

5.4.2 Relationship between Inventory Management Practices and Performance of Electoral Systems in Kenya.

The study's findings and analysis of the impact of Inventory Management Practices on the performance of Kenyan electoral systems suggest several recommendations that can enhance their effectiveness. First and foremost, the report strongly

recommends the development and implementation of standardized processes for the handling, storage, and transportation of voting materials. The implementation of clear rules is crucial in ensuring consistency and minimizing the occurrence of errors or mishandling during elections. By establishing well-defined guidelines, election officials can effectively handle voting materials with precision and accuracy. Moreover, providing comprehensive training to these officials on proper voting material handling practices further enhances the integrity and efficiency of the electoral process. Implementing measures to prevent material degradation and ensuring the availability of materials when needed are crucial aspects that warrant attention. Moreover, the study proposes the adoption of a barcoding or RFID system as a means to effectively monitor and track the movement of voting materials in real-time. The implementation of this technique has the potential to enhance transparency, mitigate the probability of loss, and facilitate the expeditious retrieval of goods.

Furthermore, the report recommends the implementation of a centralized inventory management system in order to enhance oversight and regulation of the distribution and accessibility of voting materials. The implementation of this approach significantly mitigates the likelihood of encountering issues related to excessive or insufficient inventory levels at various polling locations. Moreover, the study proposes the utilization of advanced technological solutions to effectively monitor inventory levels in real-time. Automated notifications serve as a valuable tool in managing inventory levels, particularly when materials are depleting. By promptly alerting relevant stakeholders, these notifications facilitate timely restocking, thereby mitigating the risk of shortages. This proactive approach to inventory management not only ensures uninterrupted operations but also enhances overall efficiency and productivity. Consequently, integrating automated notifications into the inventory management system is imperative for organizations seeking to optimize resource allocation and minimize disruptions caused by material scarcity. Moreover, the study strongly advocates for the implementation of a just-in-time inventory management approach, whereby items are supplied as closely as feasible to the precise voting date. The aforementioned phenomenon leads to a reduction in the necessity for extensive storage and a decrease in the probability of encountering damage or loss.

Moreover, the study strongly advocates for the implementation of regular cycle counting activities as a crucial practice to ensure the alignment of actual inventory levels with recorded levels. The ongoing auditing process plays a crucial role in the detection and resolution of discrepancies, thereby facilitating prompt issue resolution. The study further recommends the implementation of random sampling techniques during cycle counting in order to effectively evaluate the accuracy of inventory. The implementation of this approach effectively mitigates the potential for bias in the identification of disparities.

The study strongly recommends the regular review and assessment of inventory management methods. This analysis aims to identify and evaluate potential bottlenecks, inefficiencies, and opportunities for improvement within the current system or process. By conducting a comprehensive assessment, we can gain valuable insights that will enable us to enhance overall performance and optimize resource allocation. The report proposes the adoption of a continuous improvement approach, wherein valuable insights gained from each election cycle are utilized to enhance and optimize inventory management processes for future elections. This approach aims to foster ongoing progress and refinement in the management of election resources. By systematically applying lessons learned, election officials can effectively address challenges and improve the efficiency and effectiveness of inventory management practices.

5.4.3 Relationship between Transportation Management Practices and Performance of Electoral Systems in Kenya

The study's findings and analysis of the role of Transportation Management Practices on the performance of Kenyan electoral systems suggest several recommendations that can enhance the effectiveness of electoral processes. The study proposes the adoption of advanced route optimization software as a solution to enhance the delivery of voting materials on site. By implementing this technology, the most efficient and timely routes can be planned, ensuring that voting materials reach polling stations promptly. This approach aims to address the challenges associated with the delivery process and improve the overall efficiency of the electoral system.

The implementation of GPS tracking and real-time monitoring systems is crucial in minimizing delays and ensuring the timely delivery of materials to their intended destinations. This recommendation is supported by the study, which emphasizes the importance of utilizing such technologies to track the movement of delivery vehicles and voting materials. By adopting these measures, organizations can enhance their logistical operations and improve overall efficiency in the delivery process. This approach significantly augments transparency, accountability, and the capacity to promptly address any unforeseen challenges. It is imperative to emphasize the significance of conducting comprehensive inspections of delivery vehicles and materials prior to departure, with the aim of ensuring that all components are in optimal condition. By adhering to this practice, potential issues or defects can be identified and rectified, thereby mitigating the risk of any untoward incidents during transportation. This proactive approach not only enhances operational efficiency but also safeguards the integrity of the delivered goods, ultimately contributing to voter satisfaction and organizational success. Implementing proactive measures can effectively mitigate last-minute issues and prevent unnecessary delays.

The study strongly recommends the implementation of rigorous security protocols for the transportation of voting materials in order to address concerns related to Transportation Security. In order to ensure the safety and security of transportation operations, it is imperative to implement a comprehensive set of measures. These measures encompass conducting thorough background checks for transportation personnel, employing sealed containers, and establishing secure loading and unloading processes. By adopting these practices, we can significantly mitigate potential risks and safeguard the integrity of transportation systems. It is highly recommended to implement police or security escort services for delivery vehicles, particularly in areas that pose a high risk. The implementation of an additional layer of security serves to enhance the overall protection measures and acts as a deterrent against potential threats.

Furthermore, with regards to Reverse Logistics, it is strongly recommended that a meticulously designed plan be formulated for the systematic collection of voting materials and equipment subsequent to the election. The provision of explicit

guidelines to polling station personnel regarding the proper packaging and return of materials is essential to guarantee the comprehensive and accurate inventory of all items involved in the electoral process. It is imperative to underscore the equal significance of this matter. It is highly recommended to arrange punctual pickups of materials subsequent to the election in order to mitigate congestion and potential setbacks in the process of returning said materials. Undoubtedly, it is evident that the establishment of a systematic procedure to thoroughly examine and authenticate the state of returned materials is imperative. By implementing such a process, we can ensure the accuracy and reliability of the assessment, thereby enhancing the overall efficiency and effectiveness of the inspection procedure. Ensuring the proper maintenance and functionality of all equipment is of paramount importance, as it guarantees that the equipment remains in optimal condition and can be effectively utilized in forthcoming electoral processes.

5.4.4 Relationship between Logistics Communication and Performance of Electoral Systems in Kenya

The present study has yielded significant findings and conducted a comprehensive analysis on the pivotal role of logistics communication in the performance of Kenyan electoral systems. These findings have shed light on various aspects that require attention and improvement in order to enhance the overall effectiveness of electoral processes.

Consequently, this study puts forth a number of recommendations that can be implemented to address the identified issues and optimize the functioning of the electoral systems in Kenya. The topic of discussion pertains to the mode of communication, a subject of utmost importance in today's interconnected world. In this report, we aim to present a persuasive argument regarding the significance of selecting an appropriate mode of communication for effective and efficient information exchange. By examining the advantages and disadvantages of various communication channels, we will shed light on the crucial role that this decision plays in achieving successful. The present study strongly advocates for the adoption of a comprehensive communication strategy that encompasses a diverse range of

channels to effectively disseminate election-related information to a broad spectrum of individuals. It is imperative to recognize the significance of employing various communication platforms, including but not limited to mobile phones, email, social media, and traditional media, in order to maximize the reach and impact of such information. By embracing a multifaceted approach, electoral bodies can ensure that their messages are accessible and resonate with a wide audience, thereby fostering inclusivity and democratic participation. The proposed solution effectively caters to a wide range of demographics and preferences.

The present study has identified a significant factor that warrants attention and consideration. Based on the findings, it is strongly recommended that this factor be taken into account in future research and decision-making processes. In order to effectively communicate with diverse audiences, it is imperative to tailor communication messages to be culturally sensitive and relevant to the local context. This approach not only enhances the understanding and reception of the messages but also fosters a sense of inclusivity and respect for different cultural backgrounds. Cultural sensitivity in communication involves recognizing and appreciating the unique values, beliefs, and customs of a particular culture. By acknowledging and respecting these cultural nuances, communicators can avoid potential misunderstandings or unintended offense. This is particularly important when dealing with sensitive topics or when addressing audiences from different cultural backgrounds. Furthermore, the implementation of this initiative significantly fosters active participation and facilitates comprehensive comprehension within diverse communities. While it is indeed true that the study recommends Ensuring inclusivity and accessibility for all voters is of paramount importance in any democratic society. In order to achieve this, it is crucial to provide information in multiple languages commonly spoken across the country. By doing so, we can eliminate language barriers and empower individuals from diverse linguistic backgrounds to exercise their democratic rights effectively. Language diversity is a significant aspect of any nation, and acknowledging and accommodating this diversity is a fundamental principle of democracy. By providing information in multiple languages, we can bridge the gap between different linguistic communities and foster a more inclusive electoral process. One of the primary benefits of offering information in multiple

languages is the promotion of equal access to information. Language should never be a barrier preventing individuals from understanding their rights and responsibilities as voters. By providing information in languages commonly spoken across the country,

Furthermore, it is imperative to address the issue of Communication Network Needs. The study strongly recommends that a collaborative effort be undertaken with telecommunication providers to significantly improve network coverage, particularly in remote and underserved areas. This strategic partnership will prove to be instrumental in bridging the digital divide and ensuring that individuals residing in these areas have access to reliable and efficient communication services. By working hand in hand with telecommunication providers, we can effectively address the existing gaps in network coverage and extend the benefits of connectivity to all segments of society. This initiative will not only enhance communication capabilities but also foster economic development, social inclusion, and overall progress in these marginalized regions. Therefore, it is crucial to recognize the significance of this recommendation and take proactive measures to forge partnerships that will bring about positive change in communication infrastructure. The establishment of a robust and dependable communication network is of utmost importance in ensuring the prompt and efficient dissemination of vital information. The present study unequivocally proposes the imperative need to develop a comprehensive and resilient emergency communication plan in order to effectively mitigate the potential network outages or disruptions. The formulation of a comprehensive plan is imperative, encompassing contingency measures for communication and the provision of pertinent contact details for authoritative entities.

Thirdly, it is strongly recommended that a comprehensive and standardized communication procedure be established for all key stakeholders involved in the electoral process. This includes but is not limited to polling station staff, election officials, security personnel, and media outlets. By implementing clear and consistent communication protocols, the efficiency and effectiveness of the electoral process can be significantly enhanced. The implementation of this system guarantees the seamless and precise dissemination of information. The present study strongly

advocates for the implementation of a robust system that enables real-time updates and notifications pertaining to election-related activities. This system would effectively address the pressing need for timely dissemination of crucial information, including voter turnout statistics, security updates, and result announcements. By incorporating such a system, the electoral process can be significantly enhanced, ensuring transparency, efficiency, and public trust. One of the primary reasons for recommending the adoption of a real-time updates and notifications system is the dire necessity for accurate and up-to-date information during elections. In today's fast-paced world, where information spreads rapidly through various digital platforms, it is imperative that election-related updates are disseminated in real-time. This would not only keep the public well-informed but also foster a sense of inclusivity and active participation in the democratic process. Furthermore, the implementation of such a system would greatly contribute to the overall security and integrity of the electoral process. By promptly notifying stakeholders about security updates, potential threats can be identified and mitigated in a timely manner. The continuous and effective communication with stakeholders plays a pivotal role in ensuring their active involvement and informed decision-making throughout the project lifecycle. By keeping stakeholders well-informed and engaged, the project team can foster a collaborative and supportive environment that enhances project success. The study strongly recommends the implementation of a two-way communication approach that empowers voters to actively engage in the political process. By enabling voters to ask pertinent questions, report pressing issues, and provide valuable feedback, this approach will foster a more inclusive and participatory democracy. Such a communication framework will not only enhance the overall voter experience but also strengthen the relationship between citizens and their elected representatives.

Consequently, this recommendation holds immense potential to revolutionize the democratic landscape by promoting transparency, accountability, and effective governance. The achievement of this objective can be facilitated through the implementation of dedicated helplines, online platforms, or mobile applications. These technological solutions offer numerous advantages and have the potential to greatly enhance the effectiveness and accessibility of support services. By leveraging

these tools, individuals can easily access the assistance they require, regardless of their geographical location or time constraints. Moreover, the utilization of helplines, online platforms, and mobile apps can streamline the process of seeking help, ensuring a more efficient and seamless experience for users. Therefore, the adoption of these innovative technologies.

Furthermore, it is imperative to address the issue of Collaboration and Coordination in order to enhance the effectiveness of the electoral process. Our study strongly recommends the implementation of a collaborative approach, wherein various government agencies, security forces, and other relevant entities work together seamlessly to ensure smooth communication and coordination. Collaboration among these entities is crucial as it enables the sharing of resources, expertise, and information, ultimately leading to a more efficient and transparent electoral process. By pooling their resources and knowledge, government agencies can effectively address any challenges or issues that may arise during elections. Moreover, the involvement of security forces in this collaborative effort is of utmost importance. Their expertise in maintaining law and order during elections can significantly contribute to the overall security and integrity of the electoral process. By working hand in hand with other entities, security forces can ensure a safe and secure environment for voters, candidates, and election officials. In addition, coordination among all relevant entities is essential to avoid any duplication of efforts and to streamline the electoral process. By establishing clear lines of communication and coordination mechanisms, we can minimize confusion and maximize efficiency. This will result in timely decision-making, effective resource allocation, and a more cohesive electoral system. To achieve this level of collaboration and coordination, it is recommended that regular meetings and consultations be held among the involved entities. These meetings will provide a platform for

Based on the findings and analysis conducted in this study, it is strongly recommended that the following actions be taken to address the identified issues and improve the overall situation: 1. Implementation of targeted intervention programs: It is crucial to develop It is imperative to conduct comprehensive pre-election briefings with all relevant stakeholders in order to establish a cohesive understanding of communication protocols, roles, and responsibilities. By doing so, we can effectively streamline the

electoral process and enhance its overall efficiency. These briefings will serve as a platform for fostering collaboration and cooperation among stakeholders, enabling them to work harmoniously towards a shared goal. Through open and transparent communication, we can mitigate potential misunderstandings and conflicts, thereby promoting a smooth and successful electoral outcome.

Thirdly, it is imperative to address the critical concern of Data Security and Privacy. The study strongly advocates for the implementation of robust data security measures to safeguard sensitive voter information and thwart any unauthorized access. The adherence to data protection laws holds immense significance in upholding the trust of voters. The study strongly advocates for the implementation of a recommendation that emphasizes the necessity of effectively communicating the utilization of voter data. This entails ensuring transparency by clearly articulating the intended purposes of data usage. Additionally, it is imperative to provide viable options for voters who desire to exercise their right to opt out of specific communication channels. By incorporating these measures, voter trust can be bolstered, thereby enhancing the overall integrity of the electoral process.

5.4.5 Policy Recommendations

This study proposed policy recommendations aimed at mitigating the influence of election laws on the relationship between logistics management practices (specifically logistics communication, logistics planning, transport management, and inventory management practices) and the overall performance of electoral systems in Kenya. By implementing these recommendations, we can enhance the efficiency and effectiveness of electoral processes in the country. First and foremost, the study suggests the formulation and execution of a comprehensive election logistics framework which is imperative in order to establish a well-structured system that delineates the various roles, responsibilities, and prerequisites associated with logistics management practices. The establishment of this framework through legislation is imperative in order to guarantee uniformity and standardization across all electoral processes. Furthermore, it is strongly recommended that election laws be enacted to establish clear standards and protocols for logistics communication. It is

imperative to establish a comprehensive framework that encompasses several key elements to ensure effective and efficient communication within an organization. This framework should encompass stringent requirements for timely and accurate communication, a diverse range of communication channels, and the utilization of secure and reliable technologies to mitigate the risks of misinformation and disruptions. Secondly, the establishment of requirements for timely and accurate communication is crucial. Organizations must emphasize the importance of promptly conveying information to relevant stakeholders. This ensures that individuals are well-informed and can make informed decisions in a timely manner. Additionally, accuracy in communication is paramount to prevent the dissemination of erroneous or misleading information, which can have detrimental consequences for the organization and its stakeholders. Furthermore, a diverse range of communication channels should be implemented to cater to the varying needs and preferences of individuals within the organization. This includes traditional channels such as face-to-face meetings, phone calls, and emails, as well as modern digital platforms like instant messaging, video conferencing, and collaborative tools. By offering multiple channels, organizations can facilitate effective communication and accommodate different communication styles and preferences. Thirdly, the study strongly advocates for the implementation of the recommended measures. It is imperative to integrate logistics planning practices into election laws in order to establish a structured and streamlined approach to managing voting materials, transportation, and other logistical elements. By doing so, we can ensure the systematic and efficient handling of these crucial components of the electoral process. Logistics planning encompasses a set of essential prerequisites that warrant careful consideration. These prerequisites include resource allocation, contingency plans, and real-time tracking. By adhering to these minimum requirements, organizations can effectively manage their logistical operations, ensuring optimal efficiency and responsiveness. Resource allocation entails the judicious distribution of available resources, such as personnel, equipment, and finances, to meet the demands of the logistical tasks at hand. Contingency plans serve as a proactive measure, allowing organizations to anticipate and mitigate potential disruptions or unforeseen circumstances that may impede the smooth execution of logistics operations. Lastly,

real-time tracking enables organizations to monitor and assess the progress and status of their logistical.

Therefore, it is strongly recommended that legal guidelines be established to govern transportation management in electoral processes. It is imperative to establish comprehensive guidelines that encompass various aspects of secure transportation for voting materials. These guidelines should encompass provisions for the secure transportation of voting materials, the utilization of verified transportation providers, and the implementation of protocols that guarantee the safety and integrity of the transportation process. By incorporating these measures, we can enhance the overall security and reliability of the electoral system. Moreover, it is strongly recommended that there be an integration of inventory management regulations into election laws in order to effectively govern the handling, distribution, and return of voting materials. This measure is crucial for ensuring the integrity and efficiency of the electoral process. By implementing such regulations, election authorities can establish a standardized and accountable system for managing voting materials, thereby minimizing the risk of errors, tampering, or loss. Consequently, the inclusion of inventory management regulations within election laws is a necessary step towards enhancing the transparency and reliability of elections. The implementation of various measures, such as periodic inventory audits, effective management of surplus or damaged materials, and the establishment of clear accountability mechanisms, can greatly enhance organizational efficiency and mitigate potential risks. Furthermore, it is strongly recommended by research studies that it is imperative to incorporate provisions within election laws that effectively safeguard the security and privacy of voter and logistics data. By doing so, we can ensure the integrity and credibility of the electoral process, thereby bolstering public trust and confidence in our democratic system. The inclusion of these provisions is crucial in light of the increasing reliance on digital technologies and the potential vulnerabilities they pose.

With the advent of electronic voting systems and the digitization of voter and logistics data, it is paramount to establish robust safeguards to protect against unauthorized access, manipulation, or misuse of this sensitive information. By

enacting such provisions, we can mitigate the risks associated with cyber threats and potential interference in electoral processes. Safeguarding voter and logistics In order to ensure the utmost security and protection of sensitive information pertaining to logistics management, it is imperative to establish clear and comprehensive requirements for its storage, transmission, and disposal. By implementing robust measures in these areas, organizations can effectively safeguard valuable data from unauthorized access, mitigate potential risks, and maintain the trust of stakeholders. Firstly, when it comes to storage, it is crucial to employ stringent protocols that guarantee the confidentiality, integrity, and availability of sensitive information. This entails utilizing secure storage systems, such as encrypted databases or password-protected servers, to prevent unauthorized individuals from gaining access to the data. Additionally, access controls should be implemented to restrict entry to the study of utmost significance strongly advocates that it is imperative to establish a mandate for collaboration and coordination among key stakeholders involved in the electoral process, such as election management bodies, security agencies, transportation providers, and telecommunication companies. This measure is crucial in ensuring the smooth and efficient functioning of elections. By fostering cooperation and synergy among these entities, we can enhance the integrity and effectiveness of the electoral system. It is imperative that legislation clearly delineates the specific responsibilities of each entity involved in logistics operations in order to facilitate seamless and efficient processes.

Furthermore, it is strongly recommended to incorporate provisions within election laws that actively foster transparency and accountability in the realm of logistics management practices. It is imperative to enforce the requirement for the publication of logistics plans, procedures, and reports in order to facilitate public oversight and cultivate trust in the electoral process.

Furthermore, extensive research strongly suggests that it is imperative to incorporate training and capacity-building mandates for election officials and logistics personnel within the framework of election laws. By doing so, we can enhance the effectiveness and efficiency of electoral processes, ensuring the integrity and credibility of democratic systems. The inclusion of training and capacity-building

provisions in election laws serves several crucial purposes. Firstly, it establishes a legal obligation for electoral authorities to prioritize the professional development of election officials and logistics personnel. This recognition of the importance of continuous learning and skill enhancement is essential in maintaining high standards of competence and professionalism within the electoral administration. Secondly, integrating training and capacity-building requirements into election laws provides It is imperative to ensure that individuals engaged in logistics management are provided with comprehensive training in order to effectively implement best practices and fulfill their legal obligations.

In light of the findings, it is strongly recommended that a mechanism be established to facilitate regular review and amendments of logistics-related provisions within election laws. This proactive approach will ensure that the logistical aspects of elections are continuously evaluated and updated to meet the evolving needs and challenges of the electoral process. By implementing such a mechanism, electoral authorities can effectively address any logistical shortcomings and enhance the overall efficiency and effectiveness of elections. This will contribute to the integrity and credibility of the electoral system, thereby fostering public trust and confidence in the democratic process. It is imperative to maintain a contemporary legal framework that effectively adapts to the rapid pace of technological advancements, evolving logistics practices, and emerging challenges.

5.4.6 Contribution to Academia

The findings of this study offer significant insights into the logistics management practices within the broader framework of electoral system performance. The study has identified several key logistics management practices that have a significant impact on the overall performance of electoral systems. These practices include logistics communication, logistics planning, transport management, and inventory management. It is crucial to recognize the importance of these practices in order to enhance the efficiency and effectiveness of electoral processes. By implementing and improving these logistics management practices, electoral systems can achieve higher levels of performance and ensure the smooth functioning of the entire

electoral process. The findings of this study indicate that placing emphasis on logistics management practices has a substantial impact on the overall performance of electoral systems. The study strongly advocates for further research in the field of National general electoral operations. Existing literature has consistently emphasized the need for the Independent Electoral and Boundaries Commission (IEBC) to adopt a more proactive approach in managing logistics. This is crucial in order to enhance the efficiency and effectiveness of electoral processes in the country.

5.5 Areas of Further Research

Based on the obtained results, it is evident that the coefficient of determination (R^2) was calculated to be 82.5%. This signifies that the independent variables, namely Logistic communication, Logistic planning, Transport management, and Inventory management practices, collectively accounted for a substantial proportion (82.5%) of the observed variations in performance. The proposed model in this study fails to account for additional factors, which account for a significant portion of 17.5% of the data. However, the study does not provide an explanation for this discrepancy. Further investigation should be conducted to identify additional variables that account for the remaining 17.5% of performance, taking into consideration the specific context and scope of the study. This additional research will enhance our understanding of the factors influencing performance and contribute to a more comprehensive analysis of the subject matter. The present study falls short in comprehensively addressing the various aspects of logistics management practices in election operations. Therefore, it is highly recommended that further research be conducted in different countries, such as the East African region, to assess the performance of election systems. By employing the same factors utilized in this study, it would be possible to determine whether the findings remain consistent in a distinct context. An additional study could be conducted on the topic of logistics management in the context of election operations. This study would aim to measure the variable of overall performance using different proxies. By doing so, it would determine whether the findings of this study are consistent or inconsistent with the current research. This additional study would provide valuable insights and contribute to the existing body of knowledge on logistics management in election operations.

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APPENDICES

Appendix I: Introductory Letter

Dear Sir/Madam

RE: REQUEST FOR USE OF INFORMATION

I am a PhD student at Jomo Kenyatta University of Agriculture and Technology currently undertaking my research project entitled “Logistics management practices and general election performance in Africa countries”. The attached questionnaire is for gathering data, which will be useful in the aforementioned research. You have been selected as one of the respondents in this study. I therefore request you to kindly facilitate the collection of the required data by answering the questions herein.

Please note the information sought is purely for academic purposes and will be treated with utmost confidentiality.

I look forward to your co-operation.

Yours faithfully,

Muo Charles

Appendix II: Questionnaire

INSTRUCTIONS

The questionnaire is meant to collect information on Logistics management practices and general election performance in Kenya. Your honesty, clarity and willingness to contribute will be highly appreciated. Please tick on the appropriate information. Incase more space is needed use the back of the questionnaire.

PART A: RESPONDENTS GENERAL INFORMATION

1. what is your Gender Male ☐ Female ☐
2. what is your Age Bracket

20-29,	
30-39,	
40-49	
Above 50	

3. Level of academic qualification

PhD	
Masters	
Bachelor's Degree	
Diploma	
Certificate	

4. What was your role in last election in stations

Position	
Commission Secretary/Chief Executive Officer (CS/CEO),	
Deputy Commission Secretary (DCS)	
Directors,	
Managers,	
County Election Managers	
Constituency Election Coordinators	

5. How times have you participate in election management and what was your role?

.....
.....

PART B:

ROLE OF LOGISTICS PLANNING PRACTICES ON GENERAL ELECTION PERFORMANCE IN KENYA

Please indicate the extent to which of the following role of logistics planning practices on general election performance in Kenya. Please record your answer by ticking in the spaces provided, by the scale indicator (1=not at all, 2=small extent, 3=moderate, 4=large extent, 5=very large extent)

Logistics Planning Practices on General Election Performance in Kenya	1	2	3	4	5
Election body had logistics plan for election for the all process					
Election body had logistics plan policies for election for the all process					
Election Logistics planning serves to link and synchronize the overall Election supply chain as a continuous process					
Election Logistics planning is essential for effective Election supply chain connectivity.					
Logistics mapping had the ability to bring assurance that the citizens can voter					
Election Logistics planning considered Logistics Demand planning per polling station					

Average how many clients did you service in your polling station

.....
.....

ROLE OF INVENTORY MANAGEMENT PRACTICES ON GENERAL ELECTION PERFORMANCE IN KENYA

Please indicate the extent to which of the following role of inventory management practices on general election performance in Kenya. Please record your answer by ticking in the spaces provided, by the scale indicator (1=not at all, 2=small extent, 3=moderate, 4=large extent, 5=very large extent)

Role of Inventory Management Practices on General Election Performance in Kenya	1	2	3	4	5
Are you familiar with inventory management practices on election materials					
The IEBC has warehouse that is appropriate equipped with management systems for electoral technology					
To what extent was there Inventory control of the materials					
To what extent was there Cycle counting of voting materials before issuing					
To what extent was there proper Voting Material handling					
To what extent was there visibility of demand,					
To what extent was there focused on closeness of inventory storage location					
To what extent was there more on replenishment decision by supplier,					
To what extent was there focused on the ownership of inventory,					
After voting process election materials were stored in the right place					

ROLE OF TRANSPORTATION MANAGEMENT ON GENERAL ELECTION PERFORMANCE IN KENYA

Please indicate the extent to which of the following role of transportation management on general election performance in Kenya. Please record your answer by ticking in the spaces provided, by the scale indicator (1=not at all, 2=small extent, 3=moderate, 4=large extent, 5=very large extent)

Role of Transportation Management Practices on General Election Performance in Kenya	1	2	3	4	5
To what extent was there Logistics automation					
To what extent was there Logistics Security					
To what extent was there Information communication					
To what extent did you submit results using BVR machines					
To what extent did results tally with the one published in the IEBC WEBSITE					
To what extent was did the IEBC provided security to election officers					
To what extent was internet being available for submission of results					
To what extent was transportation offered to both elections official and voting materials					
To what extent was there transportation tracking to tool to both elections official and voting materials					

ROLE OF LOGISTICS COMMUNICATION PRACTICES ON GENERAL ELECTION PERFORMANCE IN Kenya

Please indicate the extent to which of the following role of logistics communication on general election performance in Kenya. Please record your answer by ticking in the spaces provided, by the scale indicator (1=not at all, 2=small extent, 3=moderate, 4=large extent, 5=very large extent)

Role of Logistics Communication Practices on General Election Performance in Kenya	1	2	3	4	5
Communication is a strategy that is useful in General Election Performance.					
Logistics communication effective has promoted changes required in General Election Performance.					
The election body keeps track of communication costs to determine whether savings from turnover outweighs costs of the program.					
We often have good communication networks during elections period					
There is consistency in communication networks					
To extent and intensity of communications during the election period requires that a thorough assessment be made of communication needs					
Arrangements should be made with telecommunications providers to have service available on urgent call throughout voting day					

Measurement of performance of electoral systems in Kenya

Measurement of Performance of Electoral Systems in Kenya	1	2	3	4	5
The availability of polling materials at my polling station on the day of the election					
There were delays in the delivery of polling materials to my polling station on the day of the election					
The transportation of polling materials from the distribution centers to the polling stations					
There were incidents of electoral fraud or irregularities during the electoral process					
There were incidents of voter intimidation or harassment during the electoral process					
The results of the election were announced in a timely and transparent manner					
The vote counting process was accurate and transparent:					
The voter registration process was efficient and effective					
The voting process was easy and accessible					
The vote counting process was accurate and transparent:					

Measuring the general election performance will compare against constitution goals (internally and externally). The following performance metrics will be used: 1-very good 2- good 3- extreme but there is room for improve

		Election performance in Kenya indicator	Scores
Reliability	Map polling stations to confirm mobile network strength	Number of polling stations mapped	
	Conduct electoral logistics and warehousing process needs assessment	Number of elections officials trained on elections technology	
	Develop an integrated electoral process logistics and warehousing framework	Status of logistics and warehousing framework	
	Automate the logistics and warehousing functions of the Commission	Extent of automation	
Responsiveness	Establish Call Centers equipped with well-trained personnel	Number of call centres in place and personnel trained	
	Establish and build the interface between manual results management with technology	Extent of ICT and manual processes interface	
	Develop an elections results management framework that includes accountability procedures, transmission process, and tallying centre management, among others	Status of Elections results management framework	
credibility	Recruit and train temporary personnel for voter registration and elections	Number of qualified temporary personnel recruited and trained	
	Verification by candidates	Number of candidates verifying	
	Harmonize election campaign schedules to improve compliance with the electoral code of conduct	Campaign schedule in place	
	Develop standardized rules and regulations for party nominations	Regulations in place	
Assets -Assessing all the resources that are used to fulfil citizen demand on election	Develop Polling Station voting plan showing the size and distribution of voters in a station and personnel deployment for effective and efficient voting	Polling station voting plan in place	
	Review the queue management system to improve the efficiency especially on the duration taken per voter	Time taken on the queue by voters	

	Improve on ballot paper colours to make them conspicuously distinct for each election	Visibility and distinctiveness of ballot papers	
	Introduce ballot-stamping pens with non-bloating ink to improve ballot marking and secrecy of the vote	Quality of ballot marking	
	Review the number of polling officials per polling stations	Number of polling officials per polling station reviewed	

Interview Questions

Interview questions to measure the role of logistics planning practices on the performance of electoral systems in Kenya

1. How important is logistics planning to the success of the electoral system in Kenya?
2. What are some of the challenges that logistics planners face in the electoral system in Kenya?
3. How do logistics planners ensure the accuracy of the inventory and tracking of election materials in the electoral system in Kenya?
4. What measures are in place to ensure the safety and security of election materials and personnel during transportation in the electoral system in Kenya?
5. How do logistics planners coordinate the deployment of election personnel to polling stations across the country in the electoral system in Kenya?
6. What are some of the best practices in logistics planning that can be adopted in the electoral system in Kenya?
7. How can logistics planning contribute to the transparency and accountability of the electoral system in Kenya?
8. How do logistics planners ensure the accessibility of polling stations to voters with disabilities in the electoral system in Kenya?
9. What are some of the innovations in logistics planning that have been introduced in the electoral system in Kenya?
10. How do logistics planners manage the risk of delays or disruptions in the logistics chain in the electoral system in Kenya?
11. How can logistics planning support the participation of women, youth, and minority groups in the electoral system in Kenya?
12. What measures are in place to prevent the theft or loss of election materials in the electoral system in Kenya?

Interview to measure the role of inventory management practices on the performance of electoral systems in Kenya:

1. How important is inventory management to the success of the electoral system in Kenya? What are some of the challenges that inventory managers face in the electoral system in Kenya?
2. How do inventory managers ensure the accuracy of inventory records in the electoral system in Kenya?
3. What measures are in place to prevent the loss or theft of election materials in the electoral system in Kenya?
4. How do inventory managers optimize the storage and distribution of election materials in the electoral system in Kenya?
5. What are some of the best practices in inventory management that can be adopted in the electoral system in Kenya?
6. How can inventory management contribute to the transparency and accountability of the electoral system in Kenya?
7. How do inventory managers ensure the availability of inclusive materials for voters with disabilities in the electoral system in Kenya?
8. What are some of the innovations in inventory management that have been introduced in the electoral system in Kenya? How do inventory managers manage the risk of shortages or excess inventory in the electoral system in Kenya?
9. How can inventory management support the participation of women, youth, and minority groups in the electoral system in Kenya?
10. What measures are in place to prevent the expiration of election materials in the electoral system in Kenya?
11. How do inventory managers ensure the efficient disposal of unused or expired election materials in the electoral system in Kenya?
12. How can inventory management improve the accuracy and timeliness of election results in the electoral system in Kenya?

Interview questions to measure the role of transportation management practices on the performance of electoral systems in Kenya:

1. What is your experience with transportation management practices in the electoral system in Kenya?
2. How important is transportation management in the electoral system in Kenya?
3. What are some of the challenges you have encountered in the transportation of election materials in Kenya?
4. How do you ensure the security of election materials during transportation?

5. How do you ensure the timely delivery of election materials to polling stations?
6. How do you handle emergency situations during transportation?
7. What role does technology play in transportation management in the electoral system in Kenya?
8. How do you evaluate the effectiveness of transportation management practices in the electoral system in Kenya?
9. What measures do you take to reduce the cost of transportation management in the electoral system in Kenya?
10. How do you ensure that transportation management practices are compliant with legal and regulatory requirements in Kenya?
11. What are some best practices in transportation management that you recommend for the electoral system in Kenya?
12. How do you work with other stakeholders, such as government agencies and political parties, to ensure the success of transportation management practices in the electoral system in Kenya?

Interview questions to measure the role of Logistics communication practices on the performance of electoral systems in Kenya:

1. What is your experience with logistics communication practices in the electoral system in Kenya?
2. How important is logistics communication in the electoral system in Kenya?
3. What are some of the challenges you have encountered in logistics communication practices in the electoral system in Kenya?
4. How do you ensure effective communication between the various stakeholders involved in the electoral system logistics, such as election officials, security personnel, and transportation providers?
5. How do you ensure the security of communication channels during the electoral process?
6. How do you measure the effectiveness of logistics communication practices in the electoral system in Kenya?
7. What role does technology play in logistics communication practices in the electoral system in Kenya?
8. What measures do you take to ensure that logistics communication practices are compliant with legal and regulatory requirements in Kenya?
9. What are some best practices in logistics communication that you recommend for the electoral system in Kenya?

10. How do you work with other stakeholders, such as government agencies and political parties, to ensure effective logistics communication practices in the electoral system in Kenya?

Interview questions to measure the moderating role of election laws on logistics management practices and the performance of electoral systems in Kenya

1. What is your understanding of the role of election laws in logistics management practices in the electoral system in Kenya?
2. How do election laws impact logistics management practices in the electoral system in Kenya?
3. In your experience, how have election laws impacted the performance of logistics management practices in the electoral system in Kenya?
4. How do logistics management practices and election laws interact to impact the performance of electoral systems in Kenya?
5. Can you provide an example of a situation where election laws have moderated logistics management practices in the electoral system in Kenya?
6. What challenges have you encountered in implementing logistics management practices in compliance with election laws in Kenya?
7. In your opinion, how can election laws be improved to better moderate logistics management practices and improve the performance of electoral systems in Kenya?
8. What measures do you take to ensure compliance with election laws in logistics management practices in the electoral system in Kenya?

Interview questions to measure the performance of electoral systems in Kenya:

1. How would you rate the fairness and transparency of the recent elections in Kenya? Re
2. How independent and impartial do you think the electoral commission is?
3. How efficient and effective was the voter registration process?
4. How easy and accessible was the voting process?
5. How accurate and transparent was the vote counting process?
6. How timely and transparent were the announcements of the election results?
7. Were there any incidents of voter intimidation or harassment during the electoral process?
8. Were there any incidents of electoral fraud or irregularities during the electoral process?
9. How efficient and effective was the electoral disputes resolution process?

10. What measures were taken to ensure the security of the electoral process?
11. Were there any incidents of violence or security breaches during the electoral process?
12. Were there any challenges faced in the transportation of polling materials?
13. How efficient and effective was the coordination between the electoral commission and the logistics providers during the electoral process?
14. Were there any incidents of miscommunication or lack of coordination between the electoral commission and the logistics providers during the electoral process?
15. How well was the electoral process communicated to the public?
16. How satisfied are you with the overall logistics arrangements for the electoral process?
17. What suggestions do you have for improving the logistics arrangements for future elections in Kenya?

Appendix III: Results for Pilot tests per variables

Reliability Statistics for Logistics Planning

Reliability Statistics for Logistics Planning the instrument was carried out using Cronbach's alpha constant (co-efficient) which is a measure of internal consistency and average correlation and the results was 0.784 which was above 0.7 according to rule of thumb acceptable alpha. (Mugenda & Mugenda, 2003).

Table 4.2: Reliability Statistics for Logistics Planning

Cronbach's Alpha	Cronbach's Alpha Based on N of Items	Standardized Items
.784	.802	10

Table 4.3 Item Statistics for Logistics Planning

	Mean	Std. Deviation	N
LP1	4.5000	.60698	20
LP2	4.3000	.80131	20
LP3	4.1500	.67082	20
LP4	4.1000	1.07115	20
LP5	4.4000	.94032	20
LP6	4.5500	.82558	20
LP7	3.8000	.95145	20
LP8	4.1500	.36635	20
LP9	3.8000	.95145	20
LP10	4.1500	.36635	20

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
LP1	37.4000	18.253	.507	.	.762
LP2	37.6000	16.989	.548	.	.753
LP3	37.7500	18.618	.377	.	.774
LP4	37.8000	16.695	.390	.	.781
LP5	37.5000	17.526	.361	.	.780
LP6	37.3500	17.082	.511	.	.758
LP7	38.1000	15.779	.604	.	.744
LP8	37.7500	19.776	.412	.	.777
LP9	38.1000	15.779	.604	.	.744
LP10	37.7500	19.776	.412	.	.777

ANOVA with Tukey's Test for Nonadditivity

	Sum of Squares	Df	Mean Square	F	Sig.
Between People	40.380	19	2.125		
Between Items	11.980	9	1.331	2.903	.003
Nonadditivity	.776 ^a	1	.776	1.699	.194
Within People	77.644	170	.457		
Residual Balance	78.420	171	.459		
Total	90.400	180	.502		
Total	130.780	199	.657		

Grand Mean = 4.1900

a. Tukey's estimate of power to which observations must be raised to achieve additivity = 3.374.

Reliability Statistics for Inventory Management

Cronbach's Alpha Cronbach's Alpha Based on N of Items
Standardized Items

.687	.701	10
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Item Statistics for Inventory Management

	Mean	Std. Deviation	N
IM1	4.1500	.58714	20
IM2	4.1000	.64072	20
IM3	4.2500	.55012	20
IM4	2.5000	1.05131	20
IM5	3.2000	1.10501	20
IM6	4.1000	.85224	20
IM7	4.0000	.79472	20
IM8	3.8500	1.03999	20
IM9	2.9500	1.09904	20
IM10	4.0500	.94451	20

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Total Correlation	Cronbach's Alpha if Item Deleted
IM1	33.0000	18.105	.463	.654
IM2	33.0500	18.050	.423	.657
IM3	32.9000	21.779	-.256	.731
IM4	34.6500	19.397	.028	.730
IM5	33.9500	16.366	.356	.664
IM6	33.0500	15.945	.602	.617
IM7	33.1500	16.134	.627	.617
IM8	33.3000	16.642	.359	.662
IM9	34.2000	16.589	.332	.670
IM10	33.1000	15.042 .659 .599		

ANOVA with Tukey's Test for No additivity

	Sum of Squares	Df	Mean Square	F	Sig.
Between People	39.455	19	2.077		
Between Items	66.205	9	7.356	11.323	.000
No additivity	.123 ^a	1	.123	.188	.665
Within People	110.972	170	.653		
Residual Balance	111.095	171	.650		
Total	177.300	180	.985		
Total	216.755	199	1.089		

Grand Mean = 3.7150

- Tukey's estimate of power to which observations must be raised to achieve additivity = 1.360.
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Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.876	.888	10

Item Statistics

	Mean	Std. Deviation	N
TM1	3.8500	.58714	20
TM2	3.8500	.58714	20
TM3	3.8500	.58714	20
TM4	3.9000	.30779	20
TM5	3.7500	.44426	20
TM6	3.8000	.41039	20
TM7	3.8500	.36635	20
TM8	3.7500	.44426	20
TM9	3.8000	.41039	20
TM10	3.8000	.61559	20

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
TM1	34.3500	8.555	.676	.	.858
TM2	34.3500	8.555	.676	.	.858
TM3	34.3500	8.555	.676	.	.858
TM4	34.3000	10.011	.573	.	.869
TM5	34.4500	9.524	.547	.	.868
TM6	34.4000	9.516	.607	.	.864
TM7	34.3500	9.713	.602	.	.866
TM8	34.4500	9.524	.547	.	.868
TM9	34.4000	9.516	.607	.	.864
TM10	34.4000	8.674	.598	.	.866

ANOVA with Tukey's Test for Non-additivity

	Sum of Squares	Df	Mean Square	F	Sig.
Between People	21.320	19	1.122		
Between Items	.420	9	.047	.336	.962
Nonadditivity	.014 ^a	1	.014	.097	.756
Within People	23.766	170	.140		
Residual Balance	23.780	171	.139		
Total	24.200	180	.134		
Total	45.520	199	.229		

Grand Mean = 3.8200

a. Tukey's estimate of power to which observations must be raised to achieve additivity = - 1.099.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.876	.891	10

Item Statistics

	Mean	Std. Deviation	N
LC1	3.8500	.58714	20
LC2	3.8000	.61559	20
LC3	3.7500	.44426	20
LC4	3.8000	.41039	20
LC5	3.8500	.36635	20
LC6	3.7500	.44426	20
LC7	3.8000	.41039	20
LC8	3.8000	.41039	20
LC9	3.8000	.61559	20
LC10	3.8500	.58714	20

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
LC1	34.2000	9.116	.641		.861
LC2	34.2500	9.250	.562		.869
LC3	34.3000	9.905	.583		.866
LC4	34.2500	9.882	.653		.862
LC5	34.2000	10.168	.613		.865
LC6	34.3000	9.905	.583		.866
LC7	34.2500	9.882	.653		.862
LC8	34.2500	9.882	.653		.862
LC9	34.2500	9.250	.562		.869
LC10	34.2000	9.116	.641		.861

ANOVA with Tukey's Test for Nonadditivity

	Sum of Squares	Df	Mean Square	F	Sig.
Between People	22.295	19	1.173		
Between Items	.245	9	.027	.187	.995
Nonadditivity	.124 ^a	1	.124	.855	.357
Within People Residual Balance	24.731	170	.145		
Total	24.855	171	.145		
Total	25.100	180	.139		
Total	47.395	199	.238		

Grand Mean = 3.8050

a. Tukey's estimate of power to which observations must be raised to achieve additivity = -7.119.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.847	.873	8

Item Statistics

	Mean	Std. Deviation	N
EL1	3.8000	.61559	20
EL2	3.7500	.44426	20
EL3	3.8000	.41039	20
EL4	3.8000	.41039	20
EL5	3.8000	.61559	20
EL6	3.8500	.58714	20
EL7	3.8000	.41039	20
EL8	3.8000	.41039	20

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
EL1	26.6000	5.832	.474	.	.848
EL2	26.6500	6.134	.586	.	.829
EL3	26.6000	6.042	.699	.	.818
EL4	26.6000	6.042	.699	.	.818
EL5	26.6000	5.832	.474	.	.848
EL6	26.5500	5.734	.548	.	.835
EL7	26.6000	6.042	.699	.	.818
EL8	26.6000	6.042	.699	.	.818

ANOVA with Tukey's Test for Nonadditivity

		Sum of Squares	Df	Mean Square	F	Sig.
Between People	Between People	18.100	19	.953		
	Between Items	.100	7	.014	.098	.998
	Nonadditivity	.093 ^a	1	.093	.638	.426
	Residual Balance	19.307	132	.146		
	Total	19.400	133	.146		
Within People	Total	19.500	140	.139		
	Total	37.600	159	.236		

Grand Mean = 3.8000

a. Tukey's estimate of power to which observations must be raised to achieve additivity = - 9.917.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
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Item Statistics

.895		Mean	Std. Deviation	N
	PE1	3.9000	.44721	20
	PE2	3.8000	.61559	20
	PE3	3.8500	.58714	20
	PE4	3.8000	.61559	20
	PE5	3.8500	.58714	20
	PE6	3.8000	.61559	20
	PE7	3.7500	.44426	20

Item-Total Statistics

ANOVA with Tukey's Test for Nonadditivity						
		Sum of Squares	Df	Mean Square	F	Sig.
PE1	Between People	25.964	19	1.367		
	Between Items	.286	6	.048	.333	.918
	Nonadditivity	.000 ^a	1	.000	.000	.991
	Residual Balance	16.286	113	.144		
	Total	16.286	114	.143		
PE2	Total	16.571	120	.138		
	Total	42.536	139	.306		

Grand Mean = 3.8214

a. Tukey's estimate of power to which observations must be raised to achieve additivity = 1.074.

