

**EFFECT OF STRATEGIC MANAGEMENT PRACTICES ON THE UTILIZATION OF
COMMUNITY-LEVEL HIV DATA IN KIAMBU COUNTY, KENYA**

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University**

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DECLARATION

I declare that this thesis describes my original work and that it has not been presented in any other university for academic work.

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DEDICATION

This work is dedicated to my family: my parents, Mr. and Mrs. Gomba, whose unwavering belief in me and steadfast guidance have been my foundation, my siblings for their constant support and encouragement, and my children whose love and boundless inspiration fuel my every endeavor, you all are my greatest motivation, and I am forever grateful.

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ABSTRACT

This study examined the influence of strategic management practices on the utilization of community-level HIV data in Kiambu County, Kenya. It focused on four key dimensions: strategy formulation, strategic leadership, resource allocation, and data collection approaches. A mixed-methods design was employed, combining quantitative data from 273 Community Health Promoters (CHPs) with qualitative insights from eight Sub-County Community Strategy Coordinators (SCCSCs). Quantitative analysis involved descriptive statistics, simple and multiple linear regression, while qualitative data were analyzed thematically to contextualize statistical patterns. The findings indicated that data collection approaches were the most significant predictor of HIV data utilization, demonstrating a strong positive statistical relationship. Strategy formulation also showed a significant influence, highlighting the importance of structured, locally adapted planning processes. Strategic leadership was moderately associated with data use, though its impact was hindered by weak supervisory structures and episodic engagement. Resource allocation exhibited the weakest statistical influence, but qualitative evidence emphasized the practical effects of unpredictable funding, reliance on personal resources, and donor dependency. Qualitative findings also revealed that community-generated data were often underutilized due to limited feedback loops, poor integration into formal plans, and insufficient training and supervision for CHPs. The study concluded that while strategic frameworks and leadership orientations are necessary, they are not sufficient for sustained HIV data use. Utilization is more determined more by the robustness of operational systems, routine supervision, and the ability to adapt strategic intent to local contexts. The study recommended that county health departments strengthen planning tools, institutionalize leadership support structures, establish dedicated budgets for community data functions, and invest in training and digital infrastructure for CHPs. These improvements are essential to enhancing the value of community-level HIV data for evidence-based programming in Kenya's decentralized health system. The findings contribute to the broader discourse on strategic management by demonstrating how internal capabilities, when aligned with frontline realities, can transform data availability into actionable insight.

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DEFINITION OF TERMS

Community-level HIV data	The data collected at the local or grassroots level on various aspects of the HIV epidemic, including prevalence, incidence, risk factors, service utilization, and program outcomes
Data collection approaches	The methods, tools, and procedures used to gather data from various sources
Data utilization	The process of analyzing, interpreting, and applying data to inform decision-making, policy formulation, resource allocation, and program improvement
Resource allocation	The process of distributing an organization's financial, human, and material resources among competing needs and priorities
Strategic leadership	The ability of leaders to articulate a clear vision, inspire and motivate others, make strategic decisions, and align resources and actions towards the achievement of organizational goals
Strategic management practices	The set of decisions, actions, and processes that organizations employ to formulate, implement, and evaluate strategies for achieving their long-term objectives
Strategy formulation	The process of defining an organization's long-term direction and scope, setting objectives, and developing plans and policies to achieve those objectives

ABBREVIATIONS/ ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ANOVA	Analysis of Variance
ART	Antiretroviral Therapy
CBO	Community-Based Organization
CDC	Centers for Disease Control and Prevention
CHMT	County Health Management Team
CHRIO	County Health Records and Information Officer
CHP	Community Health Promoter
CHW	Community Health Worker
DHIS	District Health Information System
FBO	Faith-Based Organization
HIV	Human Immunodeficiency Virus
HTS	HIV Testing Services
IRB	Institutional Review Board
KNBS	Kenya National Bureau of Statistics
MOH	Ministry of Health
NSDCC	National Syndemic Diseases Control Council
NASCOP	National AIDS and STI Control Programme
NHIS	National Health Information System
NGO	Non-Governmental Organization
PEPFAR	President's Emergency Plan for AIDS Relief
PLHIV	People Living with HIV
SCHMT	Sub-County Health Management Team
SPSS	Statistical Package for the Social Sciences
STI	Sexually Transmitted Infection
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

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CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

Chapter One introduces the study by outlining the significance of strategic management practices in optimizing the utilization of community-level HIV data in Kiambu County, Kenya. It highlights the critical role of such data in evidence-based decision-making, policy formulation, and program implementation while addressing existing gaps in its effective use. The chapter provides the study's background, objectives, problem statement, and significance, emphasizing the need to examine factors, such as strategy formulation, leadership, resource allocation, and data collection approaches. Additionally, it outlines the theoretical and conceptual frameworks, as well as the study's scope, limitations, and assumptions, providing a robust foundation for the research inquiry.

1.1 Introduction

Strategic management practices are crucial for guiding policies and interventions in community-based health programs, yet they remain underexplored. This study examines strategic practices that impact the utilization of community-level HIV data in Kiambu County, Kenya, where prevalence is currently below national levels, likely due to significant community-led HIV interventions (NSDCC, 2023 HIV Estimates). However, the effective use of data for strategic decisions remains suboptimal. The study examines strategic management practices, including strategic leadership, resource allocation, data collection systems, and planning processes, to uncover challenges and opportunities in enhancing the utilization of community-level HIV data for evidence-based decision-making in Kiambu County. The background section establishes the issues in translating available HIV data into informed programming, while the statement of the problem focuses on gaps in strategic data use for community interventions.

1.2 Background of the Study

The global response to the HIV and AIDS epidemic has made remarkable progress, yet significant challenges persist in translating data into actionable interventions. HIV and AIDS remains a leading cause of morbidity and mortality worldwide, with an estimated 38.4 million people living with the virus as of 2023. Sub-Saharan Africa accounts for 67% of these cases, reflecting the epidemic's disproportionate burden on this region (UNAIDS, 2023). The integration of community-level data into health strategies is recognized as a cornerstone of effective epidemic control, but underutilization of this data undermines progress toward global health goals. For

instance, while data collection efforts have surged globally—achieving an 85% increase since 2015—only 43% of this data is effectively leveraged to inform policies and programs in low- and middle-income countries (WHO, 2023). This inefficiency exacerbates health inequities and slows progress toward the UNAIDS 95-95-95 targets, which emphasize the critical role of data in achieving epidemic control.

Data utilization in healthcare is pivotal for evidence-based decision-making, yet it remains fraught with challenges, particularly in resource-limited settings. The disconnect between data collection and utilization stems from systemic barriers, including limited analytical capacity, fragmented data systems, and inadequate quality assurance mechanisms. In Kenya, a study by Karuri et al. (2022) found that while 90% of health facilities report having data systems, only 62% of the collected data is utilized for decision-making. This underutilization leads to inefficiencies in resource allocation, misaligned health interventions, and suboptimal patient outcomes. Furthermore, inconsistencies in data collection approaches and inadequate integration between community-level and facility-level systems exacerbate these challenges, particularly in rural and underserved areas. Addressing these systemic barriers requires not only technical solutions but also robust strategic management practices that align data systems with health priorities (Muthee et al., 2020).

Strategic management is increasingly recognized as a critical enabler of data-driven health systems. Defined as the process of formulating, implementing, and evaluating strategies to achieve organizational objectives, strategic management ensures that limited resources are allocated effectively to achieve maximum impact. In healthcare, its significance lies in its ability to align various operational components—leadership, resource allocation, and data systems—toward a common goal. Research indicates that health systems employing comprehensive strategic management frameworks achieve 32% better health outcomes compared to those without such frameworks (WHO, 2023).

Four core components underpin strategic management: strategy formulation, strategic leadership, resource allocation, and data collection approaches. Strategy formulation provides the blueprint for aligning organizational objectives with community needs, ensuring that interventions are evidence-based and contextually relevant. Strategic leadership fosters a culture of accountability and innovation, enabling organizations to adapt to emerging challenges (Aarons et

al., 2017). Resource allocation ensures that financial, human, and technological resources are directed toward high-impact areas, while robust data collection approaches form the foundation for evidence-based decision-making. Together, these components create a synergistic framework that enhances the utilization of community-level data in health systems (Waithaka et al., 2021).

Strategy formulation is the foundational process through which health organizations define their objectives and align them with community needs. In Kenya, strategy formulation in the HIV sector involves prioritizing interventions based on data-driven insights, ensuring that resources are directed toward areas of greatest impact. For instance, the Second Kenya HIV Strategic Framework (2020–2025) emphasizes the importance of aligning national targets with localized strategies to address regional disparities (NSDCC, 2023). Despite this emphasis, gaps remain in the translation of strategic goals into actionable plans at the county level. Counties with robust strategy formulation processes, such as systematic stakeholder engagement and continuous monitoring, report a 25% improvement in data utilization compared to those lacking structured frameworks (Mwangi & Nzengya, 2022). Effective strategy formulation bridges the gap between data availability and decision-making, ensuring that community-level data informs tailored interventions addressing unique epidemiological patterns.

Strategic leadership plays a pivotal role in ensuring that HIV data is effectively utilized to inform policy and programmatic decisions. Leaders in the healthcare sector are responsible for fostering a culture of accountability, promoting evidence-based decision-making, and mobilizing stakeholders toward shared goals. In the Kenyan context, counties with strong leadership structures, such as Nakuru and Makueni, have demonstrated higher rates of data utilization and programmatic success due to proactive leadership initiatives (Waithaka et al., 2021). Strategic leaders act as catalysts for change, ensuring that collected data is not only analyzed but also translated into actionable policies. However, leadership challenges such as high turnover, inadequate capacity, and political interference often undermine these efforts (Aarons et al., 2017). Leaders who prioritize continuous professional development and stakeholder collaboration are more likely to sustain effective data utilization practices, underscoring the transformative potential of leadership in health systems.

Resource allocation is a critical determinant of the functionality and effectiveness of HIV data systems. Adequate resources enable the development of robust data infrastructure, training

programs for personnel, and implementation of quality assurance mechanisms. In Kenya, counties with higher per capita investments in data systems report significantly better integration of community-level HIV data into health planning (Muthee et al., 2020). For instance, investments in electronic health records and mobile-based data collection systems in Kiambu County have enhanced data accuracy and timeliness, contributing to more efficient resource allocation and program design (Bhattacharya et al., 2019). However, resource constraints remain a persistent challenge, particularly in underserved counties where limited funding hinders the development of effective data systems. Strategic resource allocation must focus on optimizing existing resources, prioritizing high-impact interventions, and fostering partnerships to bridge funding gaps (Mpofu et al., 2020). The cyclical relationship between resource allocation and data utilization highlights the importance of sustained investments to achieve long-term health outcomes.

High-quality data collection approaches form the foundation of evidence-based health systems, directly influencing the reliability and applicability of community-level HIV data. Standardized tools and protocols are essential for ensuring consistency and comparability across data collection sites. In Kenya, counties that have adopted digital data collection tools report significantly fewer errors and higher data completeness rates than those relying on manual methods (Mpofu et al., 2020). For instance, the adoption of the District Health Information System 2 (DHIS2) platform has streamlined data entry and analysis processes, enabling real-time access to critical health indicators. However, gaps in training, inadequate supervision, and lack of standardization persist, particularly in rural areas (Kang'a et al., 2019). Strengthening data collection approaches ensures that community-level HIV data is accurate and actionable, forming the bedrock of strategic decision-making.

1.2.1 Kiambu County Utilization of Community Level HIV Data

Kiambu County is located in the central highlands of Kenya, bordering the country's capital Nairobi. After Kenya's independence in 1963, Kiambu was a district within the former Central Province administered from Nairobi as one of the most economically prosperous agricultural areas given its fertile highland terrain (Maingi, 2020). In 2013, Kenya dissolved its 8 provinces and created 47 new semi-autonomous counties with devolved governance under the 2010 constitution which took effect that year (Maingi, 2020). This gave rise to Kiambu County with its capital in Kiambu Town. Geographically small in size at just 1,161 km², Kiambu County has seen rapid

population growth in recent decades due to migration flows into neighboring Nairobi, reaching approximately 1.8 million residents as per the 2019 census. It contains twelve local administrative subdivisions known as constituencies.

Accordingly, county government manage health provision, rural roads, local infrastructure and planning, disaster response and social services oversight within their jurisdictions (Maingi, 2020). For health, county governments coordinate preventive efforts, primary health care, community health services and county referral facilities. The Ministry of Health provides technical guidance while empowering counties to contextualize interventions suiting local dynamics (Tsofa, Molyneux, Gilson & Goodman, 2017). Under county authority, various community units carry out grassroots outreach covering health promotion, events-based testing, home-based care, defaulter tracing, treatment literacy and psychosocial support groups. These community health volunteers, community health committee's advisory bodies and community-based organizations serve as vital conduits engaging populations more comprehensively (Thuku, Muriuki, Adano, Oyucho & Nelson, 2020).

County and grassroots teams further manage robust community-level data from these efforts covering HIV testing uptake, linkage numbers, enrollment metrics, default rates, condom distribution, service availability, patient experiences and more (Nyawira et al., 2019). Granular data allows visibility into localized gaps needing urgent, tailored action while also tracking countywide progress over time against national commitments (Kagwiri, Otieno & Mawenzi, 2023). Though infrastructure barriers persist, strengthening capabilities to leverage data for planning and improvement remains a strategic priority.

1.3 Statement of the Problem

The global HIV and AIDS epidemic remains a significant public health challenge, particularly in sub-Saharan Africa, where community-level interventions have become crucial in the response (UNAIDS, 2023). While Kenya has made substantial progress in expanding community-based HIV data collection, a critical gap exists between data availability and its effective utilization for decision-making and program improvement (Mochache et al., 2018).

In Kiambu County, despite extensive community-level HIV data collection, healthcare managers struggle to translate this information into actionable insights that could enhance service delivery and improve health outcomes. This underutilization affects both healthcare providers and

people living with HIV, potentially leading to misaligned interventions, inefficient resource allocation, and suboptimal treatment outcomes (Mbau et al., 2020).

Recent studies have identified that strategic management practices significantly influence data utilization in healthcare settings. Strategic planning processes can enhance the systematic incorporation of community data into decision-making (Toolkit et al., 2023). Strong data analysis capabilities enable the transformation of raw data into actionable insights (Waithaka et al., 2021). Effective leadership fosters a culture of evidence-based decision-making (Okoth et al., 2022), while robust coordination mechanisms ensure seamless data flow between stakeholders (Kagwanja et al., 2024).

This study also seeks to address critical research gaps in the strategic management of community-level HIV data within decentralized health systems. Existing literature underscores the importance of strategic management practices in health system performance, particularly their role in improving data utilization and health outcomes. However, most studies focus on individual components of strategic management, such as leadership or resource allocation, without examining their interdependencies or their collective influence on data utilization (Aarons et al., 2017; Muthee et al., 2020). Additionally, there is limited exploration of localized challenges in Kenyan counties like Kiambu, where fragmented resource allocation, weak leadership structures, and inconsistencies in data collection hinder the effective use of HIV data (Waithaka et al., 2021; Karuri et al., 2022). These gaps limit the development of tailored interventions that address the unique needs of decentralized health systems. This study contributes to filling these gaps by examining the interrelationships among strategic management variables and their impact on HIV data utilization, offering evidence-based insights for strengthening health systems in Kenya and similar contexts.

If not addressed, this disconnect between data collection and utilization could hinder Kenya's progress toward achieving the UNAIDS 95-95-95 targets, result in missed opportunities for targeted interventions, and ultimately affect the quality of care for people living with HIV (Ngugi et al., 2021). Therefore, understanding how these strategic management practices influence community-level HIV data utilization in Kiambu County is crucial for strengthening the local health system's response to HIV and AIDS.

1.4 Purpose of the Study

The study evaluated how strategic management practices influence the utilization of community-level HIV data to inform policy development, improve planning, and foster coordinated programming in Kiambu County, Kenya.

1.5 Objectives of the Study

To address the persistent challenges in utilizing community-level HIV data effectively, this study sought to assess the effect of strategic management practices on evidence-based decision-making in Kiambu County, Kenya. With HIV prevalence and programmatic responses varying across regions, Kiambu County presents a unique context where substantial data is collected but often underutilized.

1.5.1 General Objective of the Study

To assess the effect of strategic management practices on the utilization of community-level HIV data in Kiambu County, Kenya.

1.5.2 Specific Objectives of the Study

- i. To determine the influence of strategy formulation action on the utilization of community-level HIV data in Kiambu County, Kenya.
- ii. To evaluate the impact of strategic leadership offered on the utilization of community-level HIV data in Kiambu County, Kenya.
- iii. To assess the influence of resource allocation action on the utilization of community-level HIV data in Kiambu County, Kenya.
- iv. To determine the effect of data collection approaches on the utilization of community-level HIV data in Kiambu County, Kenya.

1.5.6 Hypotheses of the Study

- i. H_{01} : Strategy formulation action has no statistically significant effect on the utilization of community-level HIV data in Kiambu County, Kenya.
- ii. H_{02} : Strategic leadership offered have no statistically significant effect on the utilization of community-level HIV data in Kiambu County, Kenya
- iii. H_{03} : Resource allocation actions have no statistically significant effect on the utilization of community-level HIV data in in Kiambu County, Kenya.
- iv. H_{04} : Data collection approaches have no statistically significant effect on the utilization of community-level HIV data in Kiambu County, Kenya

1.6 Significance of the Study

This study is significant for academia, policymakers, and healthcare institutions involved in public health governance, particularly in optimizing the utilization of community-level HIV data. For academic and research institutions, it contributes to the growing body of literature on strategic management and health systems by examining how leadership, resource allocation, and strategy formulation influence data-driven decision-making. The findings will provide empirical evidence on overcoming systemic inefficiencies that hinder the integration of data into strategic health interventions. Researchers in public health and policy studies will benefit from insights into strengthening decentralized health data systems and improving evidence-based governance. By addressing gaps in leadership, resource allocation, and data collection approaches, the study enhances understanding of effective health information management. These contributions will inform future research, shaping frameworks for data-driven policy and practice in decentralized health systems.

For policymakers at both national and county levels, the study provides actionable recommendations for improving the governance of community-level HIV data. It highlights key challenges that hinder data utilization, including inadequate coordination, weak leadership, and inefficiencies in translating data into practical health interventions. Policymakers can use these insights to refine strategies that ensure health data is effectively integrated into decision-making and program planning. Strengthened policies will enhance the accountability of health institutions, improve resource allocation efficiency, and foster a culture of data-driven decision-making. By addressing existing structural weaknesses, the study supports the development of adaptive policy frameworks that respond to emerging challenges in health data management. These improvements will ultimately enhance the effectiveness of decentralized health systems in addressing HIV-related health disparities.

At the operational level, the study will benefit county health managers, program implementers, and organizations involved in HIV service delivery. By identifying and addressing leadership gaps and inconsistencies in data collection approaches, it provides practical solutions for improving the efficiency of health programs. Health managers can use these findings to enhance monitoring and evaluation (M&E) frameworks, ensuring that data is systematically integrated into program planning. Improved data utilization practices will enable better targeting of interventions, particularly for underserved populations at higher risk of HIV. Additionally, the study emphasizes the importance of capacity-building initiatives to equip healthcare personnel

with the necessary skills to analyze and apply data effectively. Strengthening inter-agency collaboration will further promote a coordinated, data-driven approach to improving health outcomes in decentralized settings.

1.7 Scope of the Study

This study examined the strategic management practices that influence the utilization of community-level HIV data within Kiambu County’s decentralized health system. The research focused on four key variables—strategy formulation, strategic leadership, resource allocation, and data collection approaches—to assess their role in shaping how HIV data is applied in decision-making at the sub-county and community levels. Rather than engaging broader policymaking bodies or county health management structures, the study specifically targeted Community Health Promoters (CHPs) and Sub-County Community Strategy Coordinators (SCCSCs), who are directly involved in the generation, supervision, and preliminary use of HIV data. This respondent focus allowed the study to explore the practical realities, systemic constraints, and operational opportunities that affect data utilization at the interface between community service delivery and sub-county health governance.

The temporal scope of the study covered the period from 2019 to 2023, capturing recent shifts in community health policy implementation and HIV data reporting practices under devolved governance. Methodologically, the research employed a mixed-methods design, combining quantitative data collected through structured questionnaires administered to CHPs with qualitative insights drawn from in-depth interviews with SCCSCs. This design enabled a comprehensive understanding of both the measurable patterns and experiential dimensions of strategic data use in community health settings. While the findings are specific to Kiambu County, they offer transferable lessons for similarly structured counties and decentralized systems, particularly in contexts where community-level data is underutilized in strategic planning. By centering on frontline data actors, this study contributes to a more grounded understanding of how strategic management practices can be strengthened to support evidence-based programming in public health.

1.8 Delimitation of the Study

This study was delimited geographically to Kiambu County, with its focus confined to stakeholders engaged in community-level HIV programming, particularly those involved in planning, oversight, and coordination of testing, treatment, and prevention services. The scope was

further narrowed to examine strategic management practices as exercised within the devolved health governance framework. Conceptually, the inquiry concentrated on strategic domains directly linked to data use, namely: strategy formulation, leadership, coordination mechanisms, and resource allocation. The study excluded peripheral or indirectly related areas such as national policy formulation, clinical practice at the provider level, and broader health system reforms in order to retain a focused analysis on systems-level managerial functions that are both actionable and within the control of sub-national health leadership. This delimitation ensured the research remained grounded in assessing how internal governance capabilities shape the use of HIV data in a devolved context.

1.9 Limitations of the Study

The study was constrained by several methodological and contextual limitations that may have influenced the scope and reliability of its findings. As with many field-based studies, the timing of data collection did not always align with the full implementation cycle of strategic interventions, potentially limiting the ability to assess their long-term influence. Variations in participant availability and institutional support occasionally led to delays or gaps in accessing key informants, which may have affected the depth of qualitative insights. Additionally, while every effort was made to ensure honest and accurate responses—including the use of anonymous surveys and interview confidentiality—there remained the possibility of response bias, particularly where participants were required to reflect on institutional weaknesses. The study also relied on self-reported data, which, although valuable for understanding perceptions and practices, is subject to personal interpretation and recall limitations.

1.10 Assumptions of the Study

This study made several assumptions, including that participant provided candid perspectives in interviews without concern of penalization for highlighting deficiencies around current data usage practices. The voluntary consent process underscores confidentiality protections and separation of data from personnel decisions. Additionally, there is an assumption that the range of participants collectively portrayed an accurate landscape view of strengths as well as strategic and systemic gaps impeding continuous, responsive integration of available data into policies, plans and localized programming. Lastly, there was an assumption that research evidence linking enhanced data utilization competencies and practices to improved HIV intervention outcomes

would compel stakeholder dedication toward strengthening identified weakness areas illuminated by the assessment.

1.11 Theoretical Framework

This study was underpinned by two complementary theoretical approaches: Resource-Based View (RBV) Theory and Realist Review Theory. These frameworks provided a robust foundation for examining the complex factors influencing the utilization of community-level HIV data in Kiambu County, Kenya. By employing both theories, the study aimed to capture the nuanced realities of data utilization practices while also understanding the broader contextual factors that shape these practices. These theoretical approaches allowed for a comprehensive examination of the technical, relational, and structural elements that collectively determine how community-level HIV data is used in decision-making processes.

1.11.1 Resource-Based View (RBV) Theory

The Resource-Based View (RBV) Theory, introduced by Wernerfelt (1984) and further developed by Barney (1991), emerged as a significant paradigm in strategic management. This theory shifted the focus of competitive advantage from external market factors to an organization's internal resources. RBV posits that an organization can achieve and sustain a competitive advantage if it possesses resources that are valuable, rare, inimitable, and non-substitutable (often summarized as the VRIN framework). These resources can be tangible, such as infrastructure and technology, or intangible, such as leadership capabilities, strategic expertise, and organizational culture. RBV is rooted in the broader discipline of strategic management and builds on earlier theories, including Penrose's (1959) insights on the firm as a bundle of resources. Barney's (1991) seminal work formalized the VRIN attributes, providing a systematic approach to understanding how resources contribute to long-term organizational success. Over time, RBV has become a cornerstone in explaining how internal capabilities drive organizational performance, particularly in dynamic environments.

RBV's application in public health and decentralized governance systems, such as Kenya's county health structures, is particularly relevant for understanding how internal capabilities influence the utilization of community-level HIV data. In this study, RBV frames the analysis of four key strategic management variables: strategy formulation, leadership, resource allocation, and data collection approaches. Strategy formulation involves designing action plans that align organizational goals with evidence-based priorities, ensuring that community-level HIV data is

systematically integrated into health interventions. Leadership represents an intangible yet critical resource, shaping organizational culture and driving accountability for data-driven decision-making. Resource allocation focuses on optimizing tangible resources like funding, technology, and personnel to enhance data utilization. Finally, data collection approaches are foundational resources that determine the quality, reliability, and timeliness of the information used to guide decisions.

RBV has been widely supported in empirical research, demonstrating its utility in various sectors, including healthcare. Studies have shown that organizations with well-developed internal capabilities outperform competitors in service delivery and operational efficiency (Barney et al., 2011). In the context of health systems, Muthee et al. (2020) highlight how resource optimization and leadership capabilities improve data systems' functionality and usability. RBV also aligns with evidence from Kenya's health sector, where counties with robust strategic management practices have reported better HIV data utilization and health outcomes (Karuri et al., 2022). Despite its strengths, RBV is not without limitations. Critics argue that the theory often underestimates the role of external factors, such as market dynamics and regulatory frameworks, in shaping organizational performance. It also assumes that resources are static and fail to account for their dynamic nature in rapidly changing environments. Furthermore, RBV lacks a strong prescriptive dimension, providing little guidance on how organizations can develop or acquire the critical resources it emphasizes (Kraaijenbrink et al., 2010). These limitations underscore the need to complement RBV with other theoretical frameworks, such as Institutional Theory, to capture the broader influences on organizational practices.

In this study, RBV provided a robust framework for analyzing how Kiambu County's internal resources—such as leadership capabilities, strategic planning expertise, and operational efficiencies—can be optimized to enhance HIV data utilization. By focusing on resource management and alignment with organizational goals, RBV helps identify internal strengths and weaknesses that affect data-driven health interventions. This theoretical perspective was particularly valuable in understanding the systemic barriers to data utilization and proposing actionable solutions for improving strategic management practices.

1.11.2 Realist Review Theory

Realist Review Theory, proposed by Pawson et al. (2005), is grounded in critical realism and posits that the effectiveness of social interventions is contingent on underlying mechanisms

triggered in specific contexts. This approach emphasizes understanding 'what works, for whom, in what circumstances, and why.' Realist Review Theory introduces the concept of context-mechanism-outcome (CMO) configurations to analyze how interventions produce their effects. This framework enables researchers to move beyond simplistic evaluations of intervention effectiveness to understand the nuanced ways in which programs interact with their environments to produce outcomes.

Advocates of Realist Review Theory, including Pawson and Tilley (1997), argue that it offers a sophisticated understanding of complex social interventions, accounting for contextual factors and mechanisms in ways that traditional systematic reviews may not. They posit that this approach is particularly valuable for informing policy by elucidating the intricacies of program implementation. Critics, such as Porter (2015), challenge the theory's philosophical underpinnings in critical realism, particularly its conceptualization of causation. Dalkin et al. (2015) note difficulties in operationalizing key concepts like 'mechanism' and 'context.' Despite these criticisms, Realist Review Theory has been applied effectively in various health system studies. Gilmore et al. (2019) utilized it to evaluate community health worker programs in low- and middle-income countries, while Mukumbang et al. (2018) applied the theory to investigate adherence to antiretroviral therapy in South Africa.

For this study, Realist Review Theory provided a framework for understanding the complex interactions between individual skills, relational partnerships, and structural procedures that influence community-level HIV data utilization in Kiambu County. It allows for an examination of why the abundance of collected data often fails to translate into responsive policies and programming. By focusing on CMO configurations, the study can explore how different factors interact to either facilitate or hinder effective data utilization. This approach will be particularly useful in identifying the specific conditions under which certain data utilization strategies are effective, and the mechanisms through which they operate. The application of Realist Review Theory in this study aims to generate actionable insights for policy-makers and practitioners, informing targeted interventions to improve data-driven decision-making in HIV management within Kiambu County.

1.12 Conceptual Framework

The conceptual framework of this study examines how strategic management practices influence the utilization of community-level HIV data in decentralized health systems. It is based

on the premise that effective leadership, structured planning, efficient resource allocation, and well-managed data collection processes create an enabling environment for evidence-based decision-making in HIV programs. Strategy formulation ensures that HIV interventions are developed through inclusive stakeholder engagement, with clear and measurable objectives that align with health priorities. Additionally, strategic plan dissemination and implementation ensure that policies are effectively communicated and translated into action at the county and facility levels. Strategic leadership strengthens this process by embedding data-driven decision-making in health governance, ensuring effective communication of strategic goals, and building workforce capacity to enhance data collection, analysis, and utilization.

Resource allocation plays a critical role in supporting HIV data management by ensuring adequate financial, human, and technological resources. Financial resource allocation ensures that funding is directed toward HIV data systems, monitoring frameworks, and digital platforms, while human resource investment guarantees that trained personnel are available for data collection, management, and interpretation. Additionally, investment in technology and infrastructure facilitates the adoption of electronic health records (EHRs), mobile health (mHealth) applications, and digital data-sharing platforms to improve accessibility and efficiency in HIV data utilization. However, for data to be impactful, it must be secure, accessible, and timely. A structured data collection approach ensures that collected HIV data is reliable, well-protected, and promptly reported, supporting real-time decision-making and intervention planning.

The utilization of community-level HIV data is the goal of these strategic management practices. Community-led data engagement and ownership ensure that local stakeholders participate in data collection and application, making HIV programs more responsive to real needs. The adoption of digital health innovations enhances the efficiency of data use by integrating automated analytics, predictive modeling, and real-time reporting tools into HIV program management. Furthermore, evidence-based program development and resource distribution ensure that HIV services, funding, and interventions are aligned with epidemiological data, optimizing the allocation of resources to high-risk populations. By strengthening strategic planning, leadership, resource investment, and data governance, this framework enables decentralized health systems to transition from passive data collection to proactive, data-driven decision-making, ultimately improving HIV program effectiveness and public health outcomes.

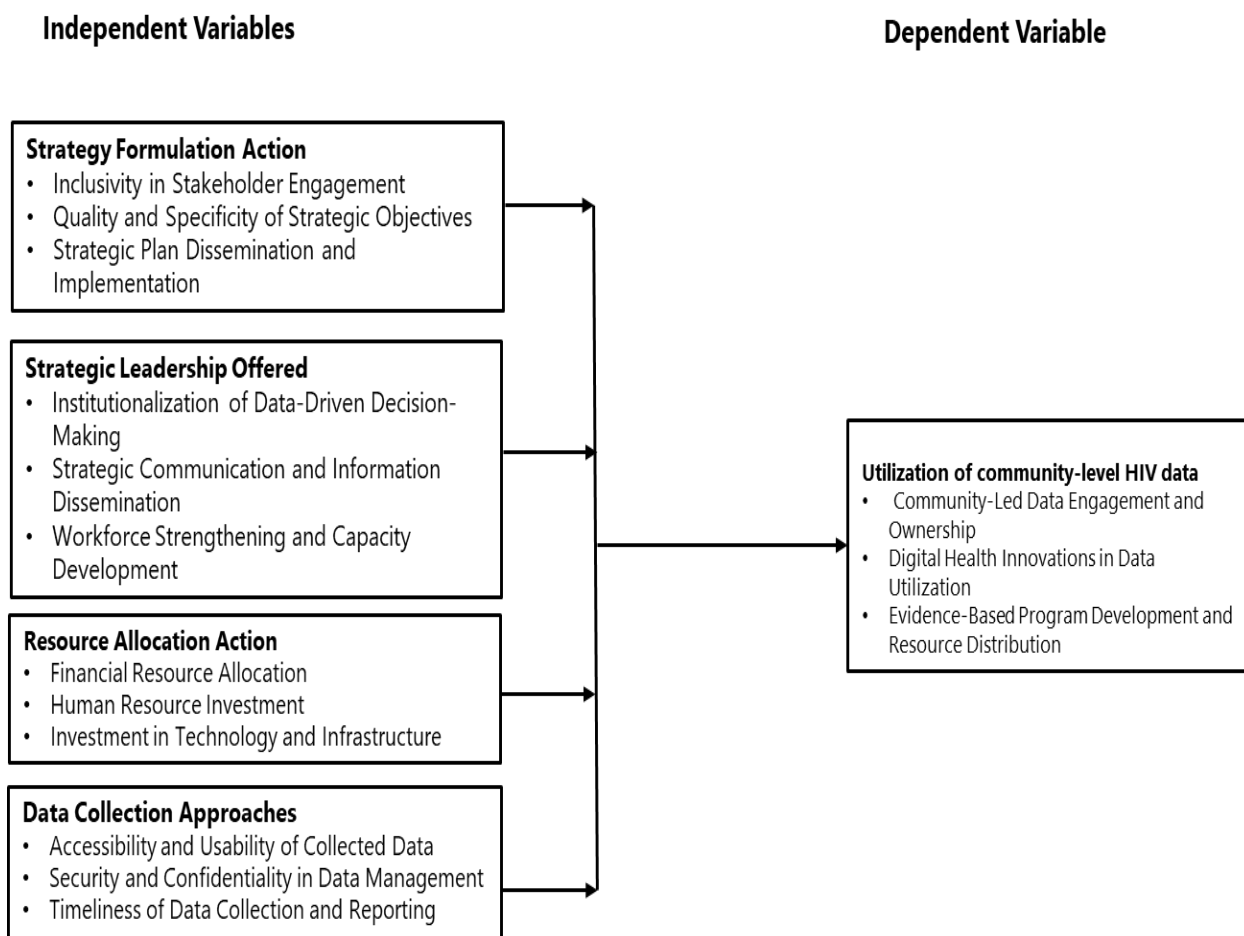


Figure 2.1: Conceptual Framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The purpose of this research was to investigate the effect of strategic management practices on the utilization of community-level HIV data in Kiambu County, Kenya. The study focused on four key variables: strategy formulation, strategic leadership, resource allocation, and data collection approaches. The chapter provides a comprehensive review of the existing literature related to these variables and their influence on the effective use of community-level HIV data in decision-making processes.

2.2 Empirical Literature Review

Empirical research on the utilization of community-level HIV data increasingly points to the pivotal role of strategic management practices in shaping how data is translated into action. Studies from diverse low- and middle-income contexts highlight that the presence of structured planning, strong leadership, adequate resource allocation, and sound data systems directly correlates with the ability of health programs to make informed decisions. In decentralized health systems like Kenya's, county-level implementation of HIV programs often hinges not just on the availability of data, but on how strategically organizations manage the systems, resources, and leadership structures that govern data use.

2.2.1 Strategy Formulation Action and Utilization of Community-Level HIV Data

Strategy formulation is a critical component of strategic management, as it sets the foundation for how organizations plan to achieve their goals and objectives. In the context of community-level HIV data utilization, effective strategy formulation involves engaging stakeholders, setting clear and specific objectives, and cascading the strategic framework to the county level.

Stakeholder involvement is a crucial component of strategy formulation in the context of community-level HIV data utilization. Engaging diverse stakeholders, such as community members, healthcare providers, local government officials, and representatives from non-governmental organizations (NGOs) and community-based organizations (CBOs), ensures that the developed strategies are inclusive, context-specific, and responsive to the needs and priorities of the communities they serve (Mwangi & Nzengya, 2022). A systematic review by Nguyen et al. (2020) emphasizes the importance of stakeholder involvement in the development of HIV

prevention and treatment strategies, finding that strategies developed with the active participation of key stakeholders, such as people living with HIV and community-based organizations, are more likely to be accepted and implemented effectively. This highlights the significance of incorporating the insights, experiences, and perspectives of those most affected by HIV in the strategy formulation process.

However, achieving meaningful stakeholder involvement in strategy formulation is not without challenges. Odhiambo et al. (2019) conducted a qualitative study exploring the barriers to stakeholder involvement in HIV strategy development in Kenya, identifying several obstacles, including power imbalances between different stakeholder groups, limited resources for facilitating meaningful engagement, and the lack of clear mechanisms for incorporating stakeholder input into the final strategy. These findings underscore the need for organizations to address these barriers and create an enabling environment for genuine and inclusive stakeholder participation in the strategy formulation process.

To overcome these challenges and facilitate effective stakeholder involvement, researchers have proposed various approaches and methodologies. Participatory action research (PAR) has emerged as a promising approach for engaging community members in the development of HIV prevention strategies. Mwendwa et al. (2022) described the use of PAR in rural Kenya, where community members participated in a series of workshops and dialogues to share their experiences, identify priorities, and contribute to the design of an HIV prevention intervention. The study found that this approach led to the development of a more community-driven and sustainable strategy, highlighting the potential of PAR in fostering meaningful stakeholder engagement and ownership.

In addition to PAR, other methods for facilitating stakeholder involvement in strategy formulation include stakeholder mapping and analysis (Mwangi, 2023), the use of community advisory boards (Nguyen et al., 2020), and the establishment of multi-stakeholder forums (Odhiambo et al., 2019). Stakeholder mapping and analysis involve identifying and assessing the interests, influence, and potential contributions of different stakeholder groups, enabling organizations to tailor their engagement strategies accordingly. Community advisory boards, consisting of representatives from key stakeholder groups, can provide valuable input and guidance throughout the strategy formulation process, ensuring that community perspectives are consistently considered. Multi-stakeholder forums, such as workshops, consultations, and

dialogues, create platforms for diverse stakeholders to come together, share their views, and collaboratively shape the strategic direction.

Effective stakeholder involvement in strategy formulation requires organizations to invest time, resources, and effort in building trust, fostering open communication, and creating inclusive and participatory processes. This may involve providing capacity building and training to stakeholders, particularly those from marginalized or underrepresented groups, to enable their meaningful participation (Mwendwa et al., 2022). It also requires a willingness to listen, learn, and adapt based on the insights and feedback provided by stakeholders, ensuring that their contributions are valued and incorporated into the final strategy.

Moreover, stakeholder involvement should not be limited to the initial strategy formulation phase but should be an ongoing process throughout the implementation and evaluation stages. Regularly engaging stakeholders in monitoring, feedback, and review processes can help ensure that the strategy remains relevant, responsive, and aligned with the evolving needs and priorities of the communities it serves (Nguyen et al., 2020). This continuous engagement can also foster a sense of shared ownership and accountability among stakeholders, enhancing the sustainability and impact of the strategy.

Inherently, stakeholder involvement is a critical aspect of strategy formulation in the context of community-level HIV data utilization. Engaging diverse stakeholders, including community members, healthcare providers, local government officials, and representatives from NGOs and CBOs, can lead to the development of more inclusive, context-specific, and responsive strategies. However, achieving meaningful stakeholder involvement requires addressing barriers such as power imbalances, limited resources, and the lack of clear engagement mechanisms. The use of participatory approaches, such as PAR, stakeholder mapping and analysis, community advisory boards, and multi-stakeholder forums, can help overcome these challenges and facilitate effective stakeholder engagement. Organizations must invest in building trust, fostering open communication, and creating inclusive and participatory processes to ensure that stakeholder contributions are valued and incorporated into the final strategy. Ongoing stakeholder involvement throughout the implementation and evaluation stages is crucial for maintaining the relevance, responsiveness, and sustainability of the strategy in addressing the complex challenges of HIV prevention and treatment at the community level.

Developing clear and specific strategic objectives is a fundamental aspect of strategy formulation in the context of community-level HIV data utilization. Well-defined and measurable objectives provide a roadmap for organizations to effectively allocate resources, guide decision-making processes, and assess progress towards achieving desired outcomes (Waweru et al., 2021). The clarity and specificity of strategic objectives have been identified as key determinants of the success and impact of HIV prevention and treatment programs, particularly in resource-limited settings (Muthee et al., 2018).

A study by Waweru et al. (2021) investigated the relationship between the clarity and specificity of strategic objectives and the effectiveness of HIV prevention programs in Kenya. The researchers found that programs with well-defined and measurable objectives were more likely to achieve their intended outcomes, such as increased HIV testing uptake and reduced HIV incidence. Clear objectives enable organizations to focus their efforts, allocate resources efficiently, and track progress over time. In contrast, programs with vague or overly broad objectives struggled to demonstrate tangible results and impact, highlighting the importance of setting specific and actionable targets.

The significance of clear and specific strategic objectives is further supported by a systematic review by Muthee et al. (2018), which examined the factors influencing the success of community-based HIV interventions in sub-Saharan Africa. The review identified the presence of well-defined objectives as a key determinant of program effectiveness, alongside other factors such as community engagement, capacity building, and the use of evidence-based approaches. This underscores the need for organizations to invest time and resources in developing robust and targeted objectives that align with the needs and priorities of the communities they serve.

To develop clear and specific strategic objectives, organizations must engage in a comprehensive process of situational analysis, stakeholder consultation, and priority setting. Kimani et al. (2019) described the application of the SMART (Specific, Measurable, Achievable, Relevant, and Time-bound) framework in guiding the development of strategic objectives for a community-based HIV testing program in Kenya. By employing this framework, the program was able to set clear targets and milestones, which facilitated monitoring and evaluation efforts and ultimately contributed to improved HIV testing uptake and linkage to care. The SMART framework provides a structured approach to objective setting, ensuring that objectives are well-defined, realistic, and aligned with the overall strategic goals of the organization.

However, the process of developing clear and specific strategic objectives can be challenging, particularly in resource-limited settings where data availability and quality may be limited. Abuya et al. (2022) conducted a qualitative study exploring the barriers to setting meaningful strategic objectives for community-level HIV programs in Kenya. The researchers found that the lack of reliable and comprehensive data on HIV prevalence, risk factors, and service utilization at the community level hindered the ability of organizations to set evidence-based objectives. Without accurate and up-to-date data, organizations may struggle to identify the most pressing needs and priorities of the communities they serve, leading to the development of objectives that are not well-aligned with the local context.

Moreover, competing priorities and the pressure to demonstrate quick results can sometimes lead to the development of objectives that are not always aligned with the most pressing needs of the communities served (Abuya et al., 2022). Organizations may face pressure from donors, policymakers, or other stakeholders to prioritize certain objectives or interventions, even if they do not necessarily address the most critical challenges faced by the community. This highlights the importance of maintaining a balance between responding to external demands and staying true to the mission and values of the organization.

To overcome these challenges, researchers have emphasized the importance of investing in robust data collection and management systems, as well as fostering a culture of data use and evidence-based decision-making (Waweru et al., 2021). Strengthening data systems and capacities at the community level can help organizations access the information they need to set relevant and targeted objectives. Additionally, the use of participatory approaches, such as community-based participatory research (CBPR), can help ensure that strategic objectives are grounded in the realities and priorities of the communities they aim to serve (Kimani et al., 2019). By actively involving community members and stakeholders in the objective-setting process, organizations can develop objectives that are more responsive to local needs and more likely to be accepted and supported by the community.

Furthermore, organizations should strive to create a culture of continuous learning and adaptation, where strategic objectives are regularly reviewed and adjusted based on emerging evidence and changing circumstances (Muthee et al., 2018). This requires establishing mechanisms for ongoing monitoring and evaluation, as well as creating spaces for reflection and dialogue among staff, stakeholders, and community members. By fostering a culture of learning

and adaptation, organizations can ensure that their strategic objectives remain relevant and effective over time.

Therefore, developing clear and specific strategic objectives is a critical component of strategy formulation in the context of community-level HIV data utilization. Well-defined and measurable objectives provide a roadmap for organizations to effectively allocate resources, guide decision-making processes, and assess progress towards achieving desired outcomes. The SMART framework offers a structured approach to objective setting, ensuring that objectives are specific, measurable, achievable, relevant, and time-bound. However, developing meaningful objectives can be challenging, particularly in resource-limited settings where data availability and quality may be limited, and competing priorities may exist. To overcome these challenges, organizations must invest in robust data systems, foster a culture of evidence-based decision-making, and employ participatory approaches to ensure that objectives are grounded in the realities and priorities of the communities they serve. By creating a culture of continuous learning and adaptation, organizations can ensure that their strategic objectives remain relevant and effective in addressing the complex challenges of HIV prevention and treatment at the community level.

Cascading the strategic framework to the county level is a crucial step in translating national HIV strategies and objectives into locally relevant and actionable plans. This process involves adapting the overarching strategic framework to the specific context and needs of each county while maintaining alignment with the national vision and goals (Muriuki et al., 2021). Effective cascading ensures that the strategies and interventions implemented at the county level are tailored to the local epidemiological, socio-cultural, and health system realities, thereby increasing their relevance, acceptability, and impact.

A study by Muriuki et al. (2021) investigated the factors influencing the successful cascade of Kenya's national HIV strategic framework to the county level. The researchers found that effective cascading required a combination of top-down and bottom-up approaches, with clear communication and coordination between national and county-level stakeholders. The involvement of county leadership in the strategy development process was identified as a key enabler of successful cascading, ensuring that county priorities and perspectives were considered and integrated into the final strategy. Additionally, the provision of technical assistance and capacity building support to county teams was found to be essential in strengthening their ability to adapt and implement the national strategy within their local contexts.

The importance of tailoring strategic frameworks to the county context is further highlighted by a case study by Onyango et al. (2022), which examined the implementation of Kenya's Fast-Track Plan to End HIV and AIDS in Kisumu County. The study found that the success of the plan hinged on the ability of county stakeholders to adapt the national targets and strategies to the local epidemiological, socio-cultural, and health system realities. This involved prioritizing interventions based on the county's HIV burden and risk profiles, engaging with local communities and leaders to build support and ownership, and strengthening the capacity of the county health system to deliver high-quality HIV services. The case study demonstrates the critical role of county-level adaptation and contextualization in ensuring the relevance and effectiveness of national HIV strategies.

However, cascading strategic frameworks to the county level is not without challenges. Muya and Kimando (2018) conducted a study assessing the influence of information systems, leadership, and governance on service quality in public hospitals in Kiambu County. They found that while leadership and governance play a significant role in improving service quality, challenges such as system integration issues and leadership coordination persist at the county level. These findings highlight the need for clear governance structures, strengthened leadership practices, and improved integration of information systems to enhance the cascading and implementation of strategic frameworks at the county level.

To address these challenges and strengthen the cascading process, researchers have proposed various strategies and approaches. Waithaka et al. (2021) described the use of a participatory approach to develop county-specific HIV strategic plans in Kenya. The approach involved the formation of county stakeholder forums, which brought together representatives from the county government, health facilities, community-based organizations, and people living with HIV to jointly review data, identify priorities, and develop tailored strategies and targets. The researchers found that this participatory approach led to increased ownership and commitment to the county plans, as well as improved alignment with the national strategic framework. By actively involving county stakeholders in the planning process, the participatory approach fostered a sense of shared responsibility and accountability for the successful implementation of the strategies.

Another strategy for enhancing the cascading process is the use of performance-based financing (PBF) mechanisms to incentivize county-level implementation of national HIV strategies. Ngugi et al. (2022) evaluated the impact of a PBF program on the uptake of HIV testing

and treatment services in selected counties in Kenya. The program provided financial rewards to county health facilities and community-based organizations based on their achievement of pre-defined targets aligned with the national HIV strategic plan. The researchers found that the PBF program led to significant improvements in HIV service coverage and quality, as well as strengthened data collection and reporting systems at the county level. The use of PBF mechanisms can help align county-level priorities and activities with national strategic objectives, while also providing motivation and resources for improved performance.

In addition to participatory approaches and PBF mechanisms, effective cascading of strategic frameworks to the county level requires strong leadership, coordination, and communication between national and county-level stakeholders (Muriuki et al., 2021). Regular dialogues, joint planning sessions, and information-sharing platforms can help foster a shared understanding of the strategic objectives, roles, and responsibilities of different actors involved in the cascading process. Moreover, investing in the capacity building of county-level stakeholders, particularly in areas such as strategic planning, data analysis, and program management, can enhance their ability to effectively adapt and implement national strategies within their local contexts (Onyango et al., 2022).

Monitoring and evaluation (M&E) systems also play a critical role in supporting the successful cascading and implementation of strategic frameworks at the county level. Robust M&E systems can help track progress towards county-specific targets and objectives, identify challenges and bottlenecks, and inform timely course corrections (Waithaka et al., 2021). The establishment of standardized indicators, data collection tools, and reporting mechanisms can facilitate the aggregation and comparison of data across counties, enabling national-level decision-makers to assess the overall progress and impact of the cascaded strategies.

In view of the reviewed literature, cascading the strategic framework to the county level is a critical process in translating national HIV strategies into locally relevant and actionable plans. Effective cascading requires a combination of top-down and bottom-up approaches, with clear communication, coordination, and capacity building support between national and county-level stakeholders. Participatory approaches, such as county stakeholder forums, can help foster ownership, commitment, and alignment with national strategic objectives. Performance-based financing mechanisms can incentivize county-level implementation and improve HIV service coverage and quality. Strong leadership, coordination, and communication, as well as investments

in capacity building and robust M&E systems, are essential for successful cascading and implementation of strategic frameworks at the county level. By tailoring national strategies to the local context and engaging county stakeholders in the planning and implementation process, organizations can enhance the relevance, acceptability, and impact of HIV prevention and treatment efforts at the community level.

2.2.2 Strategic Leadership Offered and Utilization of Community Level HIV Data

Strategic leadership plays a crucial role in the successful utilization of community-level HIV data to inform decision-making, policy development, and program implementation. Effective strategic leadership involves a combination of visionary thinking, data-driven decision-making, clear communication, and the ability to foster a culture of continuous improvement and learning (Aarons et al., 2017). In the context of HIV prevention and treatment efforts, strategic leaders must navigate complex challenges, mobilize resources, and engage diverse stakeholders to achieve desired outcomes. This section will explore three key aspects of strategic leadership: leadership commitment to data-driven decision-making, effective communication of strategic vision and goals, and fostering a culture of continuous improvement and learning.

Leadership commitment to data-driven decision-making is a critical component of strategic leadership in the context of community-level HIV data utilization. Data-driven decision-making involves the systematic collection, analysis, and interpretation of data to inform strategic choices, resource allocation, and program design (Janssen et al., 2017). When leaders prioritize and promote the use of data in decision-making processes, they create an enabling environment for evidence-based practices and improve the likelihood of achieving desired outcomes.

A study by Muthee et al. (2018) investigated the relationship between leadership commitment to data-driven decision-making and the effectiveness of HIV prevention programs in Kenya. The researchers found that programs led by individuals who actively sought out and utilized data to guide their decisions were more likely to achieve their objectives, such as increasing HIV testing uptake and reducing HIV incidence. Leaders who demonstrated a strong commitment to data-driven decision-making were able to identify gaps, prioritize interventions, and allocate resources more effectively, leading to improved program performance.

The importance of leadership commitment to data-driven decision-making is further highlighted by a systematic review by Aarons et al. (2017), which examined the role of leadership in the implementation of evidence-based practices in healthcare settings. The review found that

leaders who actively promoted the use of data and evidence in decision-making processes were more successful in facilitating the adoption and sustainability of evidence-based practices. These leaders created a culture of inquiry, encouraged staff to engage with data, and provided the necessary resources and support for data collection, analysis, and utilization.

However, fostering leadership commitment to data-driven decision-making can be challenging, particularly in resource-limited settings where data availability and quality may be limited. A qualitative study by Odhiambo et al. (2019) explored the barriers to data-driven decision-making among healthcare leaders in Kenya. The researchers found that a lack of data literacy skills, limited access to reliable data, and competing priorities were among the key barriers to the effective use of data in decision-making processes. Leaders often relied on intuition or past experiences rather than data-driven insights, leading to suboptimal decisions and resource allocation.

To address these challenges and strengthen leadership commitment to data-driven decision-making, researchers have proposed various strategies and interventions. Capacity building initiatives that focus on enhancing data literacy skills among leaders have been found to be effective in promoting the use of data in decision-making processes (Muthee et al., 2018). These initiatives may include training programs on data collection, analysis, interpretation, and visualization, as well as mentorship and coaching to support the application of data-driven insights in real-world settings.

Moreover, the establishment of robust data systems and platforms that provide leaders with timely, accurate, and actionable data can facilitate data-driven decision-making (Janssen et al., 2017). Investing in the development of user-friendly data dashboards, scorecards, and visualization tools can help leaders quickly access and interpret key performance indicators, identify trends and patterns, and make informed decisions based on the available evidence.

Leadership commitment to data-driven decision-making also requires a willingness to challenge assumptions, embrace uncertainty, and adapt strategies based on emerging evidence (Zomahoun et al., 2019). Leaders who foster a culture of inquiry, encourage experimentation, and promote a learning mindset are more likely to make data-driven decisions that are responsive to changing needs and priorities. This may involve regularly reviewing and discussing data with staff and stakeholders, seeking feedback and input from diverse perspectives, and being open to adjusting course when the data suggests a need for change.

Accordingly, leadership commitment to data-driven decision-making is a critical aspect of strategic leadership in the context of community-level HIV data utilization. When leaders prioritize and promote the use of data in decision-making processes, they create an enabling environment for evidence-based practices and improve the likelihood of achieving desired outcomes. However, fostering leadership commitment to data-driven decision-making can be challenging, particularly in resource-limited settings where data availability and quality may be limited. Capacity building initiatives, the establishment of robust data systems, and a willingness to challenge assumptions and adapt strategies based on emerging evidence are essential for strengthening leadership commitment to data-driven decision-making. By actively seeking out and utilizing data to guide their decisions, leaders can more effectively identify gaps, prioritize interventions, and allocate resources, ultimately leading to improved HIV prevention and treatment outcomes at the community level.

Effective communication of strategic vision and goals is a crucial component of strategic leadership in the context of community-level HIV data utilization. A clear and compelling strategic vision provides a sense of purpose and direction for organizations, guiding decision-making, resource allocation, and program implementation (Mayfield et al., 2017). When leaders effectively communicate the strategic vision and goals, they align stakeholders, mobilize resources, and create a shared sense of commitment to achieving desired outcomes.

A study by Hussein et al. (2021) investigated the relationship between effective communication of strategic vision and goals and the performance of community-based HIV prevention programs in Kenya. The researchers found that programs led by individuals who clearly articulated the strategic vision and goals to staff, stakeholders, and community members were more likely to achieve their objectives, such as increasing HIV testing uptake and reducing HIV incidence. Effective communication helped to create a shared understanding of the program's purpose, priorities, and expected outcomes, fostering a sense of ownership and accountability among all involved.

The importance of effective communication of strategic vision and goals is further supported by a systematic review by Gilson et al. (2019), which examined the role of leadership in the implementation of health system strengthening interventions in low- and middle-income countries. The review found that leaders who effectively communicated the strategic vision and goals were more successful in mobilizing resources, engaging stakeholders, and driving change.

These leaders used a variety of communication channels and strategies, such as face-to-face meetings, written documents, and visual aids, to ensure that the strategic vision and goals were understood and embraced by all.

However, effectively communicating strategic vision and goals can be challenging, particularly in complex and dynamic environments such as community-based HIV prevention and treatment programs. A qualitative study by Odhiambo et al. (2020) explored the barriers to effective communication of strategic vision and goals among healthcare leaders in Kenya. The researchers found that a lack of clarity in the strategic vision, limited communication skills, and inadequate stakeholder engagement were among the key barriers to effective communication. Leaders often struggled to translate the strategic vision into clear and actionable goals, leading to confusion and misalignment among staff and stakeholders.

To address these challenges and strengthen effective communication of strategic vision and goals, researchers have proposed various strategies and interventions. The development of a clear and concise strategic vision statement that articulates the organization's purpose, values, and desired outcomes is essential for effective communication (Mayfield et al., 2017). This vision statement should be developed through a participatory process that engages staff, stakeholders, and community members, ensuring that it reflects the diverse perspectives and priorities of all involved.

Moreover, leaders must invest in developing their communication skills and strategies to effectively convey the strategic vision and goals to different audiences (Gilson et al., 2019). This may involve training programs on effective communication, public speaking, and stakeholder engagement, as well as coaching and mentorship to support the application of these skills in real-world settings. Leaders should also use a variety of communication channels and tools, such as face-to-face meetings, written documents, visual aids, and digital platforms, to ensure that the strategic vision and goals are accessible and understandable to all.

Effective communication of strategic vision and goals also requires ongoing dialogue and engagement with staff, stakeholders, and community members (Odhiambo et al., 2020). Leaders should create regular opportunities for feedback, input, and discussion, such as town hall meetings, focus group discussions, and surveys, to ensure that the strategic vision and goals remain relevant and responsive to changing needs and priorities. This ongoing engagement can help to build trust, foster a sense of ownership, and create a shared commitment to achieving the strategic objectives.

As such, effective communication of strategic vision and goals is a critical aspect of strategic leadership in the context of community-level HIV data utilization. When leaders clearly articulate the strategic vision and goals to staff, stakeholders, and community members, they create a shared understanding of the program's purpose, priorities, and expected outcomes, fostering a sense of ownership and accountability. However, effectively communicating strategic vision and goals can be challenging, particularly in complex and dynamic environments. The development of a clear and concise strategic vision statement, investment in communication skills and strategies, and ongoing dialogue and engagement with staff, stakeholders, and community members are essential for strengthening effective communication of strategic vision and goals. By effectively communicating the strategic vision and goals, leaders can align stakeholders, mobilize resources, and drive change, ultimately leading to improved HIV prevention and treatment outcomes at the community level.

Fostering a culture of continuous improvement and learning is a critical component of strategic leadership in the context of community-level HIV data utilization. Continuous improvement involves the ongoing process of identifying areas for enhancement, implementing changes, and evaluating the impact of those changes to drive progress towards desired outcomes (Alagoz et al., 2018). A culture of learning, on the other hand, emphasizes the importance of acquiring new knowledge, skills, and insights through experience, reflection, and collaboration (Reichenpfader et al., 2015). When leaders foster a culture of continuous improvement and learning, they create an environment that encourages innovation, adaptability, and evidence-based practices.

A study by Okello et al. (2021) investigated the relationship between a culture of continuous improvement and learning and the effectiveness of community-based HIV prevention programs in Uganda. The researchers found that programs characterized by a strong culture of continuous improvement and learning were more likely to achieve their objectives, such as increasing HIV testing uptake and reducing HIV incidence. In these programs, leaders actively encouraged staff to identify areas for improvement, experiment with new approaches, and share lessons learned, leading to ongoing refinements in program design and implementation.

The importance of fostering a culture of continuous improvement and learning is further supported by a systematic review by Reichenpfader et al. (2015), which examined the role of organizational culture in the implementation of evidence-based practices in healthcare settings.

The review found that organizations with a strong culture of continuous improvement and learning were more successful in adopting and sustaining evidence-based practices. These organizations prioritized ongoing learning, encouraged experimentation and innovation, and provided opportunities for staff to collaborate and share knowledge.

However, fostering a culture of continuous improvement and learning can be challenging, particularly in resource-limited settings where time and resources for reflection and experimentation may be limited. A qualitative study by Abuya et al. (2019) explored the barriers to continuous improvement and learning among healthcare workers in Kenya. The researchers found that heavy workloads, limited opportunities for professional development, and a lack of leadership support were among the key barriers to fostering a culture of continuous improvement and learning. Healthcare workers often felt overwhelmed by their daily responsibilities, leaving little time for reflection and learning.

To address these challenges and foster a culture of continuous improvement and learning, researchers have proposed various strategies and interventions. The establishment of dedicated time and resources for reflection, learning, and experimentation is essential for creating a culture of continuous improvement (Alagoz et al., 2018). This may involve setting aside regular time for team meetings, workshops, and training sessions, as well as providing staff with the necessary tools and resources to engage in ongoing learning and improvement activities.

Moreover, leaders must actively model and promote a learning mindset, encouraging staff to ask questions, challenge assumptions, and seek out new knowledge and insights (Reichenpfader et al., 2015). This may involve providing opportunities for staff to attend conferences, workshops, and training programs, as well as creating forums for knowledge sharing and collaboration within and across organizations. Leaders should also recognize and reward staff who demonstrate a commitment to continuous improvement and learning, reinforcing the value and importance of these practices.

Fostering a culture of continuous improvement and learning also requires a willingness to embrace failure and learn from mistakes (Okello et al., 2021). Leaders should create a psychologically safe environment where staff feel comfortable taking risks, experimenting with new approaches, and openly discussing challenges and setbacks. This may involve reframing failure as an opportunity for learning and growth, and encouraging staff to share their experiences and insights with others.

Fostering a culture of continuous improvement and learning is a critical aspect of strategic leadership in the context of community-level HIV data utilization. When leaders create an environment that encourages innovation, adaptability, and evidence-based practices, they drive ongoing progress towards desired outcomes. However, fostering a culture of continuous improvement and learning can be challenging, particularly in resource-limited settings where time and resources for reflection and experimentation may be limited. The establishment of dedicated time and resources for learning, the active modeling and promotion of a learning mindset, and a willingness to embrace failure and learn from mistakes are essential for fostering a culture of continuous improvement and learning. By prioritizing ongoing learning, encouraging experimentation and innovation, and providing opportunities for collaboration and knowledge sharing, leaders can create an environment that supports the effective utilization of community-level HIV data to inform decision-making, policy development, and program implementation.

2.2.3 Resource Allocation Action and Utilization of Community Level HIV Data

Resource allocation is a critical component of strategic management practices in the context of community-level HIV data utilization. Effective resource allocation involves the strategic distribution of financial, human, and technological resources to support the collection, management, analysis, and utilization of HIV data to inform decision-making, policy development, and program implementation (Guthrie et al., 2017). Adequate resources are essential for building and sustaining robust data systems, attracting and retaining skilled personnel, and investing in the necessary infrastructure to support evidence-based practices. This section will explore three key aspects of resource allocation: adequacy of financial resources for data management and analysis, availability of skilled human resources for data management and utilization, and investment in technology and infrastructure to support data utilization.

Adequate financial resources are essential for the effective management and analysis of community-level HIV data. Financial resources are needed to support a range of activities, including data collection, storage, cleaning, analysis, and dissemination (Guthrie et al., 2017). Without sufficient funding, organizations may struggle to maintain high-quality data systems, attract and retain skilled personnel, and invest in the necessary technology and infrastructure to support evidence-based practices.

A study by Muthee et al. (2020) investigated the relationship between financial resource allocation and the quality of HIV data management and analysis in Kenya. The researchers found

that organizations with dedicated budgets for data management and analysis activities were more likely to have high-quality data systems and produce reliable and timely data for decision-making. These organizations were able to invest in advanced data collection tools, hire and train skilled data personnel, and regularly review and update their data management processes.

The importance of adequate financial resources for data management and analysis is further supported by a systematic review by Bhattacharya et al. (2019), which examined the factors influencing the quality and use of health data in low- and middle-income countries. The review found that insufficient funding was a major barrier to effective data management and analysis, leading to incomplete and unreliable data, limited capacity for data use, and missed opportunities for evidence-based decision-making. The authors highlighted the need for sustained investment in data systems and personnel to improve the quality and use of health data.

However, securing adequate financial resources for data management and analysis can be challenging, particularly in resource-limited settings where competing priorities may take precedence. A qualitative study by Ettorchi-Tardy et al. (2012) explored the barriers to investing in health information systems in low- and middle-income countries. The researchers found that limited political will, competing funding priorities, and a lack of understanding of the value of data among decision-makers were among the key barriers to securing adequate financial resources for data management and analysis.

To address these challenges and ensure adequate financial resources for data management and analysis, researchers have proposed various strategies and approaches. Advocating for the value of data and demonstrating the impact of data-driven decision-making on health outcomes and program effectiveness can help to build political will and secure funding for data management and analysis activities (Bhattacharya et al., 2019). This may involve developing compelling business cases, showcasing success stories, and engaging with key stakeholders to build support for data investments.

Moreover, exploring diverse funding sources and partnerships can help to sustain investments in data management and analysis over time (Guthrie et al., 2017). This may involve seeking funding from international donors, partnering with academic institutions or research organizations, and exploring opportunities for cost-sharing and collaboration with other health programs and sectors. Diversifying funding sources can help to reduce reliance on a single donor and ensure the sustainability of data investments.

Prioritizing and allocating financial resources strategically can also help to maximize the impact of limited funds (Muthee et al., 2020). This may involve conducting a needs assessment to identify the most critical data management and analysis activities, prioritizing investments in high-impact areas, and phasing investments over time to ensure the most effective use of resources. Regular monitoring and evaluation of data investments can help to identify areas for improvement and optimize resource allocation over time.

Hence, adequate financial resources are essential for the effective management and analysis of community-level HIV data. Organizations with dedicated budgets for data management and analysis activities are more likely to have high-quality data systems and produce reliable and timely data for decision-making. However, securing adequate financial resources can be challenging, particularly in resource-limited settings where competing priorities may take precedence. Advocating for the value of data, exploring diverse funding sources and partnerships, and prioritizing and allocating financial resources strategically can help to ensure adequate and sustainable investments in data management and analysis. By prioritizing and investing in data systems and personnel, organizations can strengthen their capacity to use community-level HIV data to inform decision-making, policy development, and program implementation, ultimately leading to improved health outcomes and program effectiveness.

The availability of skilled human resources is critical for the effective management and utilization of community-level HIV data. Skilled data personnel, including data managers, analysts, and visualization specialists, play a vital role in ensuring the quality, reliability, and timeliness of HIV data for decision-making (Ledikwe et al., 2014). These individuals possess the technical expertise and knowledge needed to design and maintain robust data systems, analyze and interpret complex data sets, and communicate findings to diverse stakeholders.

A study by Nicol et al. (2017) investigated the relationship between the availability of skilled data personnel and the use of HIV data for decision-making in South Africa. The researchers found that organizations with dedicated data personnel were more likely to use HIV data to inform program planning, resource allocation, and quality improvement efforts. These organizations had the capacity to generate high-quality data, analyze and interpret data regularly, and disseminate findings to key stakeholders in a timely and accessible manner.

The importance of skilled human resources for data management and utilization is further supported by a review by Zhu et al. (2019), which examined the factors influencing the

implementation of health information systems in sub-Saharan Africa. The review found that a lack of skilled data personnel was a major barrier to the effective use of health data, leading to poor data quality, limited data analysis and interpretation, and underutilization of data for decision-making. The authors emphasized the need for ongoing training and capacity building to develop and maintain a skilled data workforce.

To address these challenges and ensure the availability of skilled human resources for data management and utilization, researchers have proposed various strategies and approaches. Investing in training and capacity building programs can help to develop and maintain a skilled data workforce (Ledikwe et al., 2014). This may involve providing ongoing training opportunities, mentoring and supportive supervision, and establishing communities of practice to facilitate knowledge sharing and learning. Partnering with academic institutions and professional associations can also help to develop and deliver high-quality training programs.

Offering competitive salaries and benefits, as well as opportunities for career advancement and professional development, can also help to attract and retain skilled data personnel (Chen et al., 2023). This may involve conducting market surveys to benchmark salaries and benefits, providing performance-based incentives, and establishing clear career pathways and progression opportunities. Recognizing and rewarding outstanding performance can also help to motivate and retain skilled data personnel.

Establishing clear roles and responsibilities, as well as standardized job descriptions and competency frameworks, can help to ensure that data personnel have the necessary skills and expertise to perform their duties effectively (Nicol et al., 2017). This may involve defining the core competencies and skills required for different data roles, establishing performance standards and metrics, and regularly assessing and updating job descriptions to reflect evolving data needs and technologies.

Leveraging technology and automation can also help to reduce the burden on human resources and improve the efficiency and effectiveness of data management and utilization (Zhu et al., 2019). This may involve investing in electronic data collection tools, automated data quality checks, and data visualization and reporting platforms. Automating routine data tasks can free up data personnel to focus on more advanced analytics and data use activities.

Therefore, the availability of skilled human resources is critical for the effective management and utilization of community-level HIV data. Organizations with dedicated data

personnel are more likely to use HIV data to inform program planning, resource allocation, and quality improvement efforts. However, attracting and retaining skilled data personnel can be challenging, particularly in low-resource settings. Investing in training and capacity building programs, offering competitive salaries and benefits, establishing clear roles and responsibilities, and leveraging technology and automation can help to ensure the availability and effectiveness of skilled human resources for data management and utilization. By prioritizing and investing in a skilled data workforce, organizations can strengthen their capacity to use community-level HIV data to drive evidence-based decision-making and improve the impact and sustainability of HIV programs.

Investment in technology and infrastructure is essential for the effective utilization of community-level HIV data. Appropriate technology and infrastructure, including hardware, software, and network systems, are needed to support the collection, storage, analysis, and dissemination of HIV data (Dehnavieh et al., 2019). These investments can help to improve the efficiency, reliability, and accessibility of data systems, enabling organizations to make timely and informed decisions based on high-quality data.

A study by Manya et al. (2016) investigated the impact of investing in electronic medical record (EMR) systems on the quality and use of HIV data in Kenya. The researchers found that health facilities with EMR systems had significantly higher data quality scores and were more likely to use HIV data for decision-making compared to facilities with paper-based systems. The EMR systems enabled real-time data capture, automated data quality checks, and easy access to data for analysis and reporting.

The importance of technology and infrastructure investments for data utilization is further supported by a systematic review by Kang'a et al. (2016), which examined the factors influencing the implementation and use of health information systems in low- and middle-income countries. The review found that investments in appropriate technology and infrastructure, such as computers, software, and internet connectivity, were critical for the successful adoption and use of health information systems. The authors highlighted the need for ongoing investments in technology and infrastructure to keep pace with evolving data needs and standards.

However, investing in technology and infrastructure for data utilization can be costly and challenging, particularly in resource-limited settings where there may be competing priorities for limited funds. A qualitative study by Wagenaar et al. (2015) explored the barriers to investing in

health information systems in Mozambique. The researchers found that limited financial resources, inadequate infrastructure, and a lack of technical expertise were among the key barriers to investing in technology and infrastructure for data utilization.

To address these challenges and ensure adequate investments in technology and infrastructure for data utilization, researchers have proposed various strategies and approaches. Conducting a comprehensive needs assessment and developing a strategic plan can help to prioritize technology and infrastructure investments based on the most critical data needs and gaps (Dehnavieh et al., 2019). This may involve assessing the current state of technology and infrastructure, identifying future data needs and requirements, and developing a phased implementation plan to guide investments over time.

Leveraging open-source software and cloud-based solutions can help to reduce the costs and complexity of technology and infrastructure investments (Kang'a et al., 2016). Open-source software, such as the District Health Information Software 2 (DHIS2), can provide a low-cost and customizable platform for data management and analysis. Cloud-based solutions, such as Amazon Web Services or Microsoft Azure, can offer scalable and secure infrastructure for data storage and processing, reducing the need for expensive on-premise hardware and maintenance.

Partnering with technology vendors and service providers can also help to access the necessary expertise and support for technology and infrastructure investments (Manya et al., 2016). This may involve engaging with local or international technology firms to design, develop, and maintain data systems, or partnering with academic institutions or research organizations to access cutting-edge data technologies and methodologies. Establishing long-term partnerships can help to ensure the sustainability and scalability of technology and infrastructure investments.

Building local capacity for technology and infrastructure management and support is also critical for the long-term success and sustainability of data utilization initiatives (Wagenaar et al., 2015). This may involve providing training and mentoring to local IT staff, establishing help desk and technical support systems, and developing standard operating procedures and maintenance plans. Building local capacity can help to reduce reliance on external vendors and ensure that data systems are maintained and updated over time.

Consequently, investment in technology and infrastructure is essential for the effective utilization of community-level HIV data. Appropriate technology and infrastructure can help to improve the efficiency, reliability, and accessibility of data systems, enabling organizations to

make timely and informed decisions based on high-quality data. However, investing in technology and infrastructure can be costly and challenging, particularly in resource-limited settings. Conducting a comprehensive needs assessment, leveraging open-source software and cloud-based solutions, partnering with technology vendors and service providers, and building local capacity for technology and infrastructure management and support can help to ensure adequate and sustainable investments in data utilization. By prioritizing and investing in appropriate technology and infrastructure, organizations can strengthen their capacity to use community-level HIV data to drive evidence-based decision-making and improve the impact and sustainability of HIV programs.

2.3.4 Data Collection Approaches and Utilization of Community Level HIV Data

Data collection is a critical component of strategic management practices in the context of community-level HIV data utilization. Effective data collection involves the systematic gathering of relevant, accurate, and timely data on HIV prevalence, risk factors, service utilization, and program outcomes (Barroso et al., 2017). High-quality data collection approaches are essential for ensuring that decision-makers have access to reliable and comprehensive information to inform policy development, resource allocation, and program improvement efforts. This section will explore three key aspects of data collection: standardization of data collection tools and procedures, completeness and accuracy of collected data, and timeliness of data collection and reporting.

Standardization of data collection tools and procedures is essential for ensuring the consistency, reliability, and comparability of HIV data across different settings and time periods. Standardized data collection tools, such as questionnaires, interview guides, and data entry forms, help to ensure that data are collected in a uniform and systematic manner, reducing the risk of bias and error (Barroso et al., 2017). Standardized procedures, such as training and supervision of data collectors, data quality assurance checks, and data management protocols, help to ensure that data are collected and handled in a consistent and appropriate manner.

A study by Muthee et al. (2018) investigated the impact of standardized data collection tools and procedures on the quality of HIV data in Kenya. The researchers found that health facilities that used standardized data collection tools and followed standard operating procedures had significantly higher data quality scores compared to facilities that did not. The use of

standardized tools and procedures helped to reduce data errors, improve data completeness, and facilitate data aggregation and analysis.

The importance of standardized data collection tools and procedures is further supported by a systematic review by Abuya et al. (2020), which examined the factors influencing the quality of routine health data in low- and middle-income countries. The review found that the use of standardized data collection tools and procedures was associated with higher data quality, including improved accuracy, completeness, and timeliness. The authors highlighted the need for ongoing training and supportive supervision to ensure that data collectors are using standardized tools and following standard procedures.

However, implementing standardized data collection tools and procedures can be challenging, particularly in low-resource settings where there may be limited capacity and resources for data collection and management. A qualitative study by Mpofu et al. (2020) explored the barriers to implementing standardized data collection tools and procedures in Zimbabwe. The researchers found that inadequate training, high staff turnover, and limited access to data collection tools and equipment were among the key barriers to standardization.

To address these challenges and ensure the standardization of data collection tools and procedures, researchers have proposed various strategies and approaches. Developing and disseminating clear and user-friendly data collection tools and standard operating procedures can help to ensure that data collectors have the necessary guidance and support to collect high-quality data (Abuya et al., 2020). This may involve engaging with data collectors and other stakeholders to design tools and procedures that are feasible, acceptable, and appropriate for the local context.

Providing ongoing training and supportive supervision to data collectors can also help to ensure that standardized tools and procedures are being used correctly and consistently (Muthee et al., 2018). This may involve conducting regular training sessions, providing mentoring and feedback, and establishing data quality assurance mechanisms to identify and address data collection issues in a timely manner.

Leveraging technology and automation can also help to improve the standardization of data collection tools and procedures (Mpofu et al., 2020). This may involve using electronic data collection tools, such as mobile devices or web-based forms, to ensure that data are captured in a consistent and standardized format. Automated data quality checks and validation rules can also

help to identify and correct data errors in real-time, reducing the need for manual data cleaning and verification.

Establishing data collection and management committees or working groups can also help to ensure the standardization of data collection tools and procedures (Barroso et al., 2017). These groups can be responsible for developing and updating data collection tools and procedures, providing guidance and support to data collectors, and monitoring data quality and use. Engaging with stakeholders from different levels of the health system, including community members and service providers, can help to ensure that data collection tools and procedures are relevant, acceptable, and feasible.

Accordingly, standardization of data collection tools and procedures is essential for ensuring the consistency, reliability, and comparability of HIV data. Standardized data collection tools and procedures can help to reduce data errors, improve data completeness, and facilitate data aggregation and analysis. However, implementing standardized data collection tools and procedures can be challenging, particularly in low-resource settings. Developing and disseminating clear and user-friendly tools and procedures, providing ongoing training and supportive supervision, leveraging technology and automation, and establishing data collection and management committees can help to ensure the standardization of data collection approaches. By prioritizing and investing in the standardization of data collection tools and procedures, organizations can strengthen their capacity to collect high-quality HIV data to inform decision-making and improve the impact and sustainability of HIV programs.

Completeness and accuracy of collected data are critical for ensuring the reliability and validity of HIV data for decision-making. Completeness refers to the extent to which all relevant data elements are captured and recorded, while accuracy refers to the degree to which the data reflect the true values or characteristics of the phenomena being measured (Somi et al., 2014). Incomplete or inaccurate data can lead to biased or misleading conclusions, inappropriate resource allocation, and ineffective program interventions.

A study by Kiragga et al. (2019) investigated the completeness and accuracy of HIV data in Uganda. The researchers found that data completeness varied widely across different data elements and health facilities, with some elements, such as HIV test results, having high levels of completeness, while others, such as patient addresses, had much lower levels. The researchers also found that data accuracy was suboptimal, with discrepancies between data recorded in patient

charts and data entered into electronic databases. The authors highlighted the need for regular data quality assessments and feedback to improve data completeness and accuracy.

The importance of data completeness and accuracy is further supported by a systematic review by Cawley et al. (2019), which examined the factors influencing the quality of HIV surveillance data in sub-Saharan Africa. The review found that incomplete or inaccurate data were common, particularly in population-based surveys and routine health facility data. The authors identified several factors that influenced data completeness and accuracy, including the design and implementation of data collection tools and procedures, the capacity and motivation of data collectors, and the availability of data quality assurance mechanisms.

However, ensuring data completeness and accuracy can be challenging, particularly in low-resource settings where there may be limited capacity and resources for data collection and management. A qualitative study by Kaposhi et al. (2015) explored the barriers to ensuring data completeness and accuracy in South Africa. The researchers found that inadequate training and supervision of data collectors, high workload and staff turnover, and limited access to data collection tools and equipment were among the key barriers to data completeness and accuracy.

To address these challenges and ensure data completeness and accuracy, researchers have proposed various strategies and approaches. Providing ongoing training and supportive supervision to data collectors can help to improve their knowledge, skills, and motivation to collect complete and accurate data (Kiragga et al., 2019). This may involve conducting regular training sessions, providing mentoring and feedback, and establishing clear performance expectations and incentives for data quality.

Implementing data quality assurance mechanisms, such as data validation rules, data audits, and data quality assessments, can also help to identify and address data completeness and accuracy issues in a timely manner (Cawley et al., 2019). This may involve establishing data quality indicators and benchmarks, conducting regular data quality checks, and providing feedback and support to data collectors and managers to improve data quality.

Leveraging technology and automation can also help to improve data completeness and accuracy (Kaposhi et al., 2015). This may involve using electronic data collection tools with built-in validation rules and skip patterns to ensure that all relevant data elements are captured and that data are entered correctly. Automated data quality checks and reports can also help to identify and flag potential data quality issues for further investigation and correction.

Engaging with data users and stakeholders, including service providers, program managers, and community members, can also help to improve data completeness and accuracy (Somi et al., 2014). This may involve soliciting feedback on data collection tools and procedures, involving stakeholders in data quality assessments and improvement efforts, and communicating the importance and value of high-quality data for decision-making and program improvement.

As such, completeness and accuracy of collected data are critical for ensuring the reliability and validity of HIV data for decision-making. Incomplete or inaccurate data can lead to biased or misleading conclusions, inappropriate resource allocation, and ineffective program interventions. However, ensuring data completeness and accuracy can be challenging, particularly in low-resource settings. Providing ongoing training and supportive supervision, implementing data quality assurance mechanisms, leveraging technology and automation, and engaging with data users and stakeholders can help to improve data completeness and accuracy. By prioritizing and investing in data completeness and accuracy, organizations can strengthen their capacity to collect high-quality HIV data to inform decision-making and improve the impact and sustainability of HIV programs.

Timeliness of data collection and reporting is essential for ensuring that decision-makers have access to up-to-date and actionable information to inform HIV program planning, resource allocation, and quality improvement efforts. Timeliness refers to the speed and efficiency with which data are collected, processed, analyzed, and disseminated to relevant stakeholders (Mbondo et al., 2013). Delays in data collection and reporting can lead to outdated or incomplete information, missed opportunities for intervention, and suboptimal program performance.

A study by Mutemwa et al. (2017) investigated the timeliness of HIV data reporting in Kenya. The researchers found that the timeliness of reporting varied widely across different data sources and health facilities, with some facilities reporting data within the expected timeframes, while others experienced significant delays. The researchers identified several factors that influenced the timeliness of data reporting, including the availability of data collection tools and equipment, the capacity and motivation of data collectors and managers, and the presence of data reporting and feedback mechanisms.

The importance of timely data collection and reporting is further supported by a systematic review by Boadu et al. (2019), which examined the factors influencing the use of routine health data for decision-making in low- and middle-income countries. The review found that timely data

were critical for informing decision-making, particularly in the context of disease outbreaks, resource allocation, and program evaluation. The authors highlighted the need for investments in data collection and reporting systems, as well as capacity building and incentives for data collectors and managers to improve data timeliness.

However, ensuring timely data collection and reporting can be challenging, particularly in low-resource settings where there may be limited infrastructure, capacity, and resources for data management. A qualitative study by Schwitters et al. (2019) explored the barriers to timely data collection and reporting in Ethiopia. The researchers found that inadequate data collection tools and equipment, high staff turnover and workload, and limited data reporting and feedback mechanisms were among the key barriers to data timeliness.

To address these challenges and ensure timely data collection and reporting, researchers have proposed various strategies and approaches. Investing in data collection and reporting infrastructure, such as electronic health record systems, mobile data collection tools, and data warehouses, can help to streamline data management processes and reduce delays (Mutemwa et al., 2017). This may involve assessing the current state of data collection and reporting systems, identifying gaps and needs, and developing a strategic plan for strengthening data infrastructure over time.

Providing ongoing training and supportive supervision to data collectors and managers can also help to improve their capacity and motivation to collect and report data in a timely manner (Boadu et al., 2019). This may involve conducting regular training sessions on data collection and reporting procedures, providing mentoring and feedback, and establishing clear performance expectations and incentives for data timeliness.

Implementing data reporting and feedback mechanisms, such as regular data review meetings, data dashboards, and data quality reports, can also help to improve data timeliness (Schwitters et al., 2019). This may involve establishing clear data reporting schedules and deadlines, providing regular feedback to data collectors and managers on data timeliness and quality, and using data to inform program planning and improvement efforts.

Leveraging technology and automation can also help to improve data timeliness (Mbondo et al., 2013). This may involve using electronic data collection tools with real-time data synchronization and reporting capabilities, automating data quality checks and reports, and

establishing data exchange and interoperability standards to facilitate data sharing and use across different systems and stakeholders.

Engaging with data users and stakeholders, including program managers, policymakers, and community members, can also help to improve data timeliness (Mutemwa et al., 2017). This may involve soliciting feedback on data needs and priorities, involving stakeholders in data collection and reporting processes, and communicating the importance and value of timely data for decision-making and program improvement.

The timeliness of data collection and reporting is thus essential for ensuring that decision-makers have access to up-to-date and actionable information to inform HIV program planning, resource allocation, and quality improvement efforts. Delays in data collection and reporting can lead to outdated or incomplete information, missed opportunities for intervention, and suboptimal program performance. However, ensuring timely data collection and reporting can be challenging, particularly in low-resource settings. Investing in data collection and reporting infrastructure, providing ongoing training and supportive supervision, implementing data reporting and feedback mechanisms, leveraging technology and automation, and engaging data users and stakeholders can help to improve data timeliness. By prioritizing and investing in timely data collection and reporting, organizations can strengthen their capacity to use HIV data to drive evidence-based decision-making and improve the impact and sustainability of HIV programs.

2.3 Summary of Review of Literature and Research Gap(s).

The literature review has explored various aspects of strategic management practices and their influence on the utilization of community-level HIV data. The review has highlighted the importance of strategy formulation, strategic leadership, resource allocation, and data collection approaches in enhancing the effective use of data for decision-making and program improvement. However, the review has also identified several research gaps that warrant further investigation. The following table summarizes the key findings and research gaps identified in the literature review:

Table 2.1: Research Gaps

Author	Title	Methodology	Findings	Research Gaps
Aarons et al. (2021)	Leadership strategies for enhancing HIV program performance	Systematic Review	Leaders who foster a learning culture and use data improve HIV intervention performance	Lack of studies on embedding data-driven leadership approaches in under-resourced settings
Abuya et al. (2020)	Factors influencing the quality of routine health data in low- and middle-income countries	Systematic Review	Identified key barriers to data quality, including inadequate training and infrastructure	Need for research on interventions to improve health data quality in low-resource settings
Alagoz et al. (2018)	Continuous improvement in healthcare settings	Cross-sectional Study	Dedicated time and resources for reflection and learning improve program performance in healthcare settings	Need for research on allocating resources for learning and improvement in HIV programs within resource-limited settings
Barasa et al. (2022)	Autonomy of public health facilities in decentralised contexts	Qualitative Study	Autonomy in public health facilities can lead to better resource allocation and service delivery	Lack of research on long-term impacts of decentralization on HIV service delivery in Kenya
Barroso et al. (2017)	Community-based participatory research in epidemiology:	Systematic review of HIV data collection approaches	Highlighted the importance of standardized tools and procedures for ensuring data	Limited research on the most effective strategies for ensuring the standardization of

Author	Title	Methodology	Findings	Research Gaps
	Challenges and opportunities for improving population health in sub-Saharan Africa		consistency and reliability.	data collection tools and procedures across different settings and data sources.
Bhattacharjee et al. (2019)	Evaluation of Program Science Study community-based HIV self-testing delivery strategies		HIV self-testing reduces undiagnosed infections	Lack of research on linkage to care after HIV self-testing
Bhattacharya et al. (2019)	District decision-making for health in low-income settings: a case study of the potential of public and private sector data in India and Ethiopia	Semi-structured interviews with administrators and data managers in two districts in India and Ethiopia	Both India and Ethiopia collect health data across all six WHO health system blocks, but there is limited formal data sharing between public and private sectors. Ethiopia has better formal structures for data sharing compared to India. Maternal and child health data dominate in both countries.	Need for more research on strategies to formalize data sharing between public and private sectors and how these linkages can be optimized to improve district-level decision-making.

Author	Title	Methodology	Findings	Research Gaps
Boadu et al. (2019)	Factors Influencing Routine Health Data Timeliness	Systematic review	Timely data collection is critical for effective decision-making, particularly during outbreaks and in low-resource settings where allocation efforts.	Need for further research on how technology can support real-time data collection and reporting, especially in low-resource settings where infrastructure and capacity are limited.
Cawley et al. (2019)	Risk factors for service use in HIV testing models	Longitudinal Study	Identified key risk factors influencing the use of HIV services	Need for more studies on risk factors for HIV testing uptake in specific populations
Dehnavieh et al. (2019)	The District Health Information System (DHIS2): A literature review and meta-synthesis of its strengths and operational challenges based on the experiences of 11 countries	Systematic Review	Comprehensive needs assessments and strategic planning guide effective technology and infrastructure investments in health data systems.	Limited research on the implementation of phased investment plans for data infrastructure improvements in resource-constrained settings.

Author	Title	Methodology	Findings	Research Gaps
Ettorchi-Tardy et al. (2012)	Benchmarking: a method for continuous quality improvement in health	Literature review on benchmarking in healthcare	Benchmarking is a management approach that allows for the implementation of best practices at the best cost.	Limited research on the long-term impact of benchmarking on healthcare quality improvement and cost reduction, especially in diverse healthcare systems. Further studies needed on adapting benchmarking to different healthcare contexts.
Gilson et al. (2019)	Role of leadership in implementing health system strengthening interventions	Systematic Review	Leaders who clearly communicate strategic goals are more successful in mobilizing resources and engaging stakeholders	Need for studies on leadership communication methods in low-resource settings
Guthrie et al. (2017)	Similar costs and outcomes for differentiated service delivery models for HIV treatment in Uganda	Systematic Review	Adequate financial resources are essential for effective HIV data management and utilization.	Lack of research on the optimal allocation of financial resources for data systems in low-resource settings.

Author	Title	Methodology	Findings	Research Gaps
Hussein et al. (2021)	Institutionalizing community health services in Kenya	Policy Review	Successful institutionalization requires strong political commitment and adequate funding	Lack of studies on challenges of scaling community health services in low-resource settings
Janssen et al. (2017)	Leadership commitment to data-driven decision-making	Case Study	Leadership commitment to using data enhances decision-making and resource allocation	Lack of research on integrating leadership training programs with data literacy in community health programs
Kagwanja et al. (2024)	Power and positionality in health system responsiveness at sub-national level	Case Study	Power dynamics significantly affect the responsiveness of health systems	Lack of research on addressing power imbalances in the implementation of HIV policies at sub-national levels
Kang'a et al. (2016)	A national standards-based assessment on functionality of electronic medical records systems used in Kenyan public-sector health facilities.	Systematic Review	Investments in appropriate technology and infrastructure improve the adoption and use of health information systems.	Lack of research on the scalability and sustainability of technology investments for HIV data systems in resource-constrained environments.

Author	Title	Methodology	Findings	Research Gaps
Kaposhi et al. (2015)	Evaluation of antiretroviral treatment programme monitoring in Eastern Cape, South Africa	Qualitative study	Identified inadequate training, supervision, high workload, and limited tools as barriers to ensuring data completeness and accuracy.	Need for further research on scalable training and supervision models to address barriers affecting data completeness and accuracy.
Karuri et al. (2018)	Perceived impact of devolved health services on DHIS2	Qualitative Study	DHIS2 has improved health data management, but counties face challenges in implementation	Need for studies on long-term effects of DHIS2 in enhancing data quality
Kimani et al. (2019)	Application of SMART objectives in community-based HIV testing programs	Qualitative Study	Clear objectives using SMART framework improve program success	Lack of research on contextualizing the SMART framework for different HIV programs in rural areas
Kiragga et al. (2019)	Quality and accuracy of routine data captured in the HIV electronic medical record at an urban	Mixed methods study	Found that data completeness varied significantly across different data elements, with accuracy also being suboptimal.	Lack of comprehensive studies on the specific factors influencing data completeness and accuracy in the context of HIV

Author	Title	Methodology	Findings	Research Gaps
	Ugandan referral center			programs across sub-Saharan Africa.
Manya et al. (2016)	National roll out of District Health Information Software (DHIS 2) in Kenya, 2011--Central server and Cloud based infrastructure	Mixed-Methods Study	Health facilities with EMR systems have better-quality data and are more likely to use data for decision-making compared to paper-based systems.	Limited research on the cost-effectiveness and sustainability of EMR systems in rural and resource-limited settings.
Mayfield et al. (2017)	Effective communication of strategic vision and goals	Cross-sectional Study	Clear communication of strategic goals aligns stakeholders and improves program outcomes	Research needed on how communication strategies can be adapted for rural community-level HIV programs
Mbau et al. (2020)	Purchasing reforms towards universal health coverage by NHIF	Mixed-Methods	Purchasing reforms lead to improved health coverage	Limited research on NHIF reforms' impact on HIV data utilization
Mochache et al. (2018)	Community-participatory intervention to promote uptake of maternal and	Before-After Study	Community participation leads to better uptake of health services	Need for exploration of scalable models for community engagement in HIV care and treatment

Author	Title	Methodology	Findings	Research Gaps
	child health services			
Mpofu et al. (2020)	Strengthening monitoring and evaluation systems in resource-limited countries	Program Review	Task-shifting in M&E improves sustainability in health information systems	Limited research on the effectiveness of task-shifting in data management for HIV programs
Muinga et al. (2020)	Digital health systems in Kenyan public hospitals	Mixed-Methods	Digital health systems improve data collection and decision-making	Need for studies on the long-term sustainability of digital health systems in rural areas
Mutemwa et al. (2017)	Does service integration improve technical quality of care in low-resource settings? An evaluation of a model integrating HIV care into family planning services in Kenya.	Mixed-Methods Evaluation	Found that integrating HIV care into family planning services improved the technical quality of care, but the implementation was challenging due to resource constraints.	Limited research on scalable models for integrating HIV care into other health services in low-resource settings, especially those focusing on long-term sustainability and cost-effectiveness.

Author	Title	Methodology	Findings	Research Gaps
Muthee et al. (2018)	Site readiness assessment preceding the implementation of a HIV care and treatment electronic medical record system in Kenya.	Mixed-Methods Study	Organizations with dedicated budgets for data management activities have higher-quality data and improved decision-making.	Need for more research on financial management best practices to optimize HIV data utilization.
Muthee et al. (2018)	The impact of routine data quality assessments on electronic medical record data quality in Kenya	Quantitative study in Kenya	Facilities using standardized data collection tools reported higher data quality scores.	Lack of research on specific challenges faced by facilities in implementing standardized data collection tools in low-resource settings.
Muya & Kimando et al. (2018)	An assessment of the influence of information system, leadership and governance on service quality in public hospitals in Kiambu County.	Mixed-Methods Study	Found that effective leadership, governance, and information systems significantly improve service quality in public hospitals, but challenges in system integration and leadership	Need for more research on sustainable governance models and leadership practices that can enhance the integration of information systems in public health settings in Kenya.

Author	Title	Methodology	Findings	Research Gaps
			coordination persist.	
Mwangi & Nzengya (2022)	Effects of beneficiary accessibility on community health volunteer performance	Quantitative Study	Accessibility and family roles significantly affect performance of health volunteers	Need for research on the role of volunteerism in the performance of HIV-related health programs
Mwangi et al. (2021)	Strategic leadership in community-level HIV data utilization	Mixed-Methods Study	Strong strategic leadership improves the use of data to inform decisions, leading to better program outcomes	Limited research on the role of continuous leadership engagement in sustaining HIV program results
Ngugi et al. (2021)	Utilization of health services in rural Kenya	Cross-sectional Study	Household factors significantly affect health service utilization	Need for research on overcoming household barriers to HIV service access
Nguyen et al. (2020)	Stakeholder involvement in HIV prevention strategies	Systematic Review	Stakeholder involvement is critical for successful HIV strategy implementation	Lack of studies on long-term impacts of stakeholder involvement in HIV data-driven decision-making
Odhiambo et al. (2019)	Barriers to data-driven decision-making in	Qualitative Study	Barriers include lack of data literacy, limited	Research needed on interventions to address these

Author	Title	Methodology	Findings	Research Gaps
	healthcare leadership		access to reliable data, and competing priorities	barriers in resource-limited settings
Odhiambo et al. (2020)	Barriers to effective communication of strategic vision and goals in healthcare leaders	Qualitative Study	Key barriers include lack of clarity in strategic vision and inadequate communication skills	Limited research on overcoming communication barriers in community-level HIV data utilization strategies
Okello et al. (2021)	Leadership and a culture of continuous improvement and learning	Mixed-Methods Study	Programs with a strong culture of continuous learning and improvement are more effective in HIV prevention efforts	Research needed on fostering continuous improvement and learning in resource-constrained environments
Onyango et al. (2022)	Reaching 95-95-95 targets: The role of private sector health facilities	Case Study	Private health facilities play a critical role in closing the HIV detection gap	Limited research on how private sector facilities can integrate with national HIV data systems
Reichenpfader et al. (2015)	Role of organizational culture in implementing	Systematic Review	Organizations with a strong culture of continuous learning are more	Lack of studies on strategies for sustaining a learning culture in low-

Author	Title	Methodology	Findings	Research Gaps
	evidence-based practices		successful in sustaining evidence-based practices	resource healthcare settings
Schwitters et al. (2019)	Barriers to health care in rural Mozambique: Mobile health clinics for ART	Rapid Ethnographic Assessment	Identified logistical and cultural barriers to ART delivery	Limited research on overcoming logistical barriers in mobile ART clinics
Subandoro et al. (2022)	Positioning Nutrition with Universal Health Coverage: Optimizing Health Financing Levers.	Mixed-Methods Study	Effective resource allocation improves efficiency in HIV service delivery and data utilization.	Research required on strategies for optimizing resource allocation to maximize HIV data utilization in under-resourced settings.
Van Olmen et al. (2010)	Primary Health Care in the 21st century	Policy Review	Primary health care models empower communities	Limited research on the role of community empowerment in HIV data utilization
Wagenaar et al. (2015)	Data-driven quality improvement in low-and middle-income country health systems: lessons from seven years of implementation	Semi-structured in-depth interviews (IDIs) with program staff and Ministry of Health officials in	Implementing data-driven quality improvements across three countries resulted in increased clinical protocol adherence,	Limited research on how to sustain and scale data-driven quality improvements in low-resource settings, especially beyond initial external donor

Author	Title	Methodology	Findings	Research Gaps
	experience across Mozambique, Rwanda, and Zambia	Mozambique, Rwanda, and Zambia.	ownership of health data, and more collaborative data usage for change.	funding support. Further research needed on systematic coding and standardization of qualitative data from similar projects.
Waithaka et al. (2018)	Healthcare priority setting practices at the county level in Kenya	Qualitative Study	Counties struggle with setting priorities due to limited resources and coordination challenges	Need for research on improving priority setting practices in resource-constrained environments
Waweru et al. (2021)	Relationship between clarity of strategic objectives and HIV prevention program success	Mixed-Methods Study	Well-defined objectives enhance program performance in HIV testing	Research needed on challenges in maintaining clarity of strategic objectives in rapidly evolving health crises
Zeng et al. (2014)	Efficiency of HIV/AIDS health centers and effect of community-based health insurance and performance-based financing on HIV/AIDS	Quantitative Study	Performance-based financing improves HIV service delivery efficiency	Need for studies on the scalability of performance-based financing in HIV service delivery systems

Author	Title	Methodology	Findings	Research Gaps
	service delivery in Rwanda			
Zhu et al. (2019)	Health Information Systems in Sub-Saharan Africa	Systematic Review	Lack of skilled data personnel is a significant barrier to effective data use and management.	Research needed on capacity-building strategies for skilled data personnel in sub-Saharan Africa.
Zomahounet al. (2019)	The pitfalls of scaling up evidence-based interventions in health.	Systematic Review	Identified key challenges in scaling up evidence-based interventions, including contextual barriers, resource limitations, and adaptation difficulties.	Need for more research on specific strategies to overcome barriers in scaling up interventions in low-resource settings and how to ensure sustainability of scaled interventions.

The identified research gaps highlight the need for further empirical studies to deepen our understanding of the complex relationships between strategic management practices and the utilization of community-level HIV data. Future research should focus on addressing these gaps and generating evidence to inform the design and implementation of effective strategies for enhancing data-driven decision-making and program improvement in the context of HIV prevention, treatment, and care programs.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology employed in the study on the effect of strategic management practices on the utilization of community-level HIV data in Kiambu County, Kenya. It covers the research design, research site, target population, study sample, data collection instruments and procedures, data processing and analysis, and legal and ethical considerations.

3.2 Research Design

A research design is a framework or blueprint for conducting a research project, which specifies the methods and procedures for collecting, analyzing, and interpreting data (Creswell & Creswell, 2018). It is the overall strategy that guides the integration of the different components of the study in a coherent and logical way, thereby addressing the research problem effectively (De Vaus, 2001).

This study adopted a mixed-methods research design, incorporating both quantitative and qualitative approaches (Taherdoost, 2016). It used an explanatory sequential mixed-methods design, where quantitative data collection and analysis will be conducted first to provide a broad understanding of the research problem. The qualitative component followed, using interviews to explain and expand on the quantitative findings, ensuring a deeper understanding of the relationships between strategic management practices and community-level HIV data utilization (Creswell & Plano Clark, 2017).

The quantitative component involved a cross-sectional survey to collect data on strategic management practices and community-level HIV data utilization from a representative sample of health facilities and community-based organizations in Kiambu County. The qualitative component included semi-structured interviews with key informants, Sub-County Community Health Coordinators, to gain deeper insights into the challenges, best practices, and potential solutions for enhancing data utilization through strategic management.

The mixed-methods design allowed for a comprehensive understanding of the complex relationships between strategic management practices and data utilization, enabling the triangulation of findings from multiple data sources. This approach strengthened the validity and reliability of the study results and provide actionable recommendations for improving the use of community-level HIV data in decision-making and program improvement.

3.3 Research Site

The study was conducted in Kiambu County, Kenya, which is located in the central region of the country, bordering the capital city of Nairobi. Kiambu County has a population of approximately 2.4 million people and is divided into 12 sub-counties. The county has a relatively low HIV prevalence compared to the national average, with an estimated prevalence of 2.1% among adults aged 15-49 years (NSDCC, 2023 Estimates).

Kiambu County has a well-established network of health facilities and community-based organizations involved in HIV prevention, treatment, and care services. The county has also implemented various initiatives to strengthen the collection and use of community-level HIV data, such as the establishment of a county health information system and the training of health workers and Community Health Promoters on data management and utilization.

The selection of Kiambu County as the research site was based on its relatively low HIV burden, the presence of a diverse range of health facilities and community-based organizations, and the ongoing efforts to enhance the use of community-level HIV data in decision-making and program improvement. The findings from this study provided valuable insights and lessons that can be applied to other counties and settings facing similar challenges in data utilization.

3.4 Target Population

The target population for a research study comprised of the entire group of individuals or entities about which researchers aim to draw conclusions and generalize their findings (Banerjee & Chaudhury, 2010; Levy & Lemeshow, 2008). In this study, the target population consisted of two key groups within Kiambu County, Kenya: Community Health Promoters (CHPs) across all 12 sub-counties and the Sub-County Community Strategy Coordinators.

The CHPs play a crucial role in the community health system, serving as the frontline workers who collect and report vital community-level HIV data. Their intimate knowledge of local contexts and direct interaction with community members make them invaluable sources of information for this study. To ensure relevance and quality of data, the study included CHPs who are actively involved in HIV prevention, testing, treatment, or care services; who regularly collect and report community-level HIV data to the county health information system; and who have at least one year of experience in their current role.

Table 3.2: Distribution of CHPs Across Kiambu Sub-Counties

Sub-County	Total CHPs	Total SCCHSC
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Gatundu North	223	1
Gatundu South	221	1
Githunguri	249	1
Juja	304	1
Kabete	354	1
Kiambaa	195	1
Kiambu	161	1
Kikuyu	333	1
Lari	231	1
Limuru	260	1
Ruiru	310	1
Thika	229	1
Total	3,070	12

Source: (Kiambu County Community Health Strategy, 2024)

The Sub-County Community Strategy Coordinators represent a crucial middle-management layer within Kenya's devolved health system. At the Sub-County level, the Community Strategy Coordinators work under the County Director of Health and are responsible for overseeing the implementation of the Community Health Strategy across the entire county. They coordinate with various health programs, including HIV, TB, maternal and child health, and non-communicable diseases, to ensure effective community health interventions. They also serve as the direct link between community health units and the County health management team. They supervise Community Health Assistants (CHAs), oversee the functionality of community health units, and ensure proper data flow from Community Health Promoters (CHPs) through to the county level. These coordinators play a pivotal role in data quality assurance, capacity building of community health personnel, and the integration of community health services with facility-based care.

By focusing on these coordinators at sub-county levels, the study aimed to examine how strategic management practices influence the utilization of community-level HIV data in Kiambu County. This approach allowed for an investigation of data management processes at a crucial intermediary level, where community health data is aggregated, validated, and transmitted between the community level and higher management structures. The inclusion of sub-county coordinators

enabled the research to explore the dynamics of data flow, quality assurance mechanisms, and how this information informs strategic decision-making at different levels of the health system.

3.5 Study Sample

The study sample comprised the subset of the target population from which data was collected to address the research objectives and questions. This group of participants or units was selected to represent the larger population of interest, allowing for meaningful insights and generalizations (Martínez-Mesa et al., 2016). The quality of a study's sample is crucial as it directly impacts the validity and reliability of the research findings (Setia, 2016). Careful consideration of sample size and composition is essential to ensure that the selected participants adequately reflect the characteristics and diversity of the broader population under investigation (Sharma & Singh, 2022).

3.5.1 Sampling Procedure

Sampling is the process of selecting a representative subset of the population for observation and analysis (Sharma, 2017). It is a technique used to select a small group of individuals or entities from a larger population in a way that ensures the selected group reflects the characteristics of the entire population (Alvi, 2016). This study employed a multi-stage sampling procedure to select the sample from the target population, which comprises Community Health Promoters (CHPs) and Sub-County Community Strategy Coordinators in Kiambu County, Kenya.

In the first stage, a stratified random sampling technique was used to select CHPs from each of the 12 sub-counties in Kiambu County. The stratification was based on the distribution of CHPs across sub-counties as indicated in Table 2, ensuring proportional representation. Within each sub-county, CHPs were randomly selected from the existing registry, ensuring that the sample includes individuals actively involved in HIV prevention, testing, treatment, or care services. This process ensures that the selected sample accurately reflects the diversity and distribution of CHPs across the county.

In the second stage, purposive sampling was used to select all 12 Sub-County Community Strategy Coordinators (SCCSCs). These coordinators are few in number, and their roles are pivotal in overseeing the aggregation and flow of community-level data to higher management structures. The purposive selection ensured the inclusion of coordinators directly involved in data management and decision-making processes, as their insights are critical for understanding strategic management practices and data utilization.

This sampling procedure ensured that the study captures both the breadth of perspectives from CHPs and the strategic insights of the sub-county coordinators. By combining stratified random sampling for CHPs and purposive sampling for coordinators, the study ensured a representative and contextually relevant sample, enabling a comprehensive examination of the factors influencing the utilization of community-level HIV data in Kiambu County.

3.5.2 Study Sample Size

Sampling is the process of selecting a subset of individuals from a larger population to estimate characteristics of the whole population (Taherdoost, 2016). This study employed distinct sampling techniques for the quantitative and qualitative components to ensure that each approach appropriately captures the required data. For the quantitative component, a stratified random sampling technique was used to select Community Health Promoters (CHPs) from all 12 sub-counties in Kiambu County. This technique ensured that the sample is representative of the population by accounting for variations in sub-county distribution and facility characteristics. For the qualitative component, a purposive sampling method was employed to select key informants, who include the Sub-County Community Strategy Coordinators (SCCSCs). These individuals were chosen based on their roles in managing community-level HIV data, their expertise in strategic management, and their ability to provide in-depth insights into the study's research questions. For the Community Health Promoters (CHPs), stratified random sampling was used. This technique involved dividing the population into homogeneous subgroups (strata) before sampling, ensuring that the sample is representative of the entire population (Etikan & Bala, 2017).

To determine the sample size, the Yamane formula (1967) was applied:

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

Where:

n = sample size

N = population size (3,070 CHPs)

e = margin of error (0.05 for 95% confidence level)

$$n = \frac{3,070}{(1 + 3,070(0.05)^2)}$$

$$n = \frac{3,070}{(1 + 7.675)}$$

$$n = \frac{3,070}{8.675}$$

$$n \approx 354 \text{ CHVs}$$

To ensure proportional representation from each sub-county, proportional allocation was used:

$$nh = \left(\frac{Nh}{N}\right) * n$$

Where:

nh = sample size for stratum h

Nh = population size for stratum h

N = total population size n = total sample size

The sample distribution across sub-counties is presented in Table 3.

Table 3.3: Sample Distribution of CHPs Across Sub-Counties

Sub-County	Total CHPs	Sample Size	Total sCCSC
(Nh)	(nh)		
Gatundu North	223	26	1
Gatundu South	221	25	1
Githunguri	249	29	1
Juja	304	35	1
Kabete	354	41	1
Kiambaa	195	22	1
Kiambu	161	19	1
Kikuyu	333	38	1
Lari	231	27	1
Limuru	260	30	1
Ruiru	310	36	1
Thika	229	26	1
Total	3,070	354	12

Source: (Kiambu County Community Health Strategy, 2024)

The study employed purposive sampling to engage Community Strategy Coordinators in Kiambu County, the key personnel responsible for overseeing community health operations and

data management at sub-county level. The target sample comprised 12 key informants who are the Sub-County Community Strategy Coordinators (SCCSC) for the 12 sub-counties in Kiambu.

This comprehensive approach ensured representation from all administrative levels involved in community health data management within the county. The sample size is informed by qualitative research principles, where studies have demonstrated that data saturation - the point at which new data no longer yields additional insights - typically occurs within 6-12 interviews (Hennink et al., 2017).

By including all sub-county coordinators, the study sought to capture the complete spectrum of experiences and perspectives in community health data management across Kiambu County's health system. This sampling strategy enabled a thorough understanding of the processes, challenges, and opportunities in community-level HIV data utilization at these crucial coordination points. This sampling strategy ensured a comprehensive representation of both front-line workers (CHPs) and management (Sub-County Community Strategy Coordinators), allowing for a thorough examination of strategic management practices and their impact on community-level HIV data utilization in Kiambu County.

3.6 Data Collection

Effective data collection is central to ensuring the accuracy, reliability, and validity of research findings. In this study, data collection was guided by the research objectives and the mixed-methods approach, which integrated both quantitative and qualitative strands. The study drew on structured questionnaires to obtain standardized responses from Community Health Promoters (CHPs), enabling statistical measurement of strategic management practices and HIV data utilization. In addition, in-depth interviews were conducted with Sub-County Community Strategy Coordinators (SCCSCs) to capture nuanced perspectives and contextual insights that would enrich the interpretation of quantitative results.

3.6.1 Data Collection Instruments

Data collection instruments are tools used to gather information from respondents or participants in a study (Johnson & Christensen, 2019). They are designed to measure variables, test hypotheses, and answer research questions (Kabir, 2016). The study used two main data collection instruments. A structured questionnaire for the quantitative survey. The questionnaire was developed based on a comprehensive review of the literature on strategic management practices and community-level HIV data utilization. It included closed-ended questions on the four

key variables of interest (strategy formulation, strategic leadership, resource allocation, and data collection approaches), as well as questions on the utilization of community-level HIV data in decision-making and program improvement. The questionnaire was pretested and refined before the main data collection. It also used an interview guide for the qualitative interviews. The interview guide was developed based on the study objectives and the key themes emerging from the literature review. It included open-ended questions on the challenges, best practices, and potential solutions for enhancing the utilization of community-level HIV data through strategic management practices. The interview guide was pilot-tested and refined before the main data collection.

3.6.2 Pilot Testing of Research Instruments

Pilot testing is a small-scale trial run of a research instrument or procedure to identify potential problems and make necessary adjustments before the main study (Thabane et al., 2010). It is a crucial step in ensuring the validity and reliability of the research instruments and the feasibility of the study procedures (Hassan, Schattner, & Mazza, 2006). The research instruments were pilot tested on a small sample of CHPs and members of the Sub-County Community Strategy Coordinators from Kirinyaga County. The pilot testing involved administering the questionnaire to 35 respondents (CHPs) and conducting interviews with 2 key informants (Sub-County Community Strategy Coordinators). The data from the pilot testing was analyzed to assess the reliability and validity of the instruments, as well as to identify any ambiguities or difficulties in understanding the questions. Based on the feedback from the pilot testing, the instruments were revised and finalized for the main data collection.

3.6.3 Instrument Reliability

Reliability refers to the consistency, stability, and repeatability of a measure or instrument (Mohajan, 2017). It is the degree to which an instrument produces stable and consistent results when administered repeatedly under the same conditions (Heale & Twycross, 2015). The reliability of the questionnaire was assessed using Cronbach's alpha, which measures the internal consistency of the items in the instrument. A Cronbach's alpha coefficient of 0.7 or higher was considered acceptable for the study. For the qualitative interviews, reliability was ensured through the use of a standardized interview guide, the training of interviewers, and the consistent application of data collection procedures across all participants.

3.6.4 Instrument Validity

Validity refers to the extent to which an instrument measures what it is intended to measure (Heale & Twycross, 2015). It is the degree to which the results of a study can be accurately interpreted and generalized to other populations or settings (Mohajan, 2017). The validity of the questionnaire was assessed through content validity and construct validity. Content validity was established through a review of the instrument by a panel of experts in strategic management and HIV data utilization. Construct validity was assessed through factor analysis to determine the underlying dimensions of the variables measured by the instrument. For the qualitative interviews, validity was ensured through the use of triangulation, member checking, and peer debriefing to confirm the accuracy and credibility of the findings.

3.6.5 Data Collection Procedures

The data collection was conducted by a team of trained research assistants, who were supervised by the principal investigator. The research assistants were trained on the study objectives, data collection instruments, ethical considerations, and data quality assurance procedures. For the quantitative survey, the research assistants visited the selected health facilities and community-based organizations and administer the questionnaire to the respondents in a face-to-face setting. The respondents will be assured of confidentiality and will be given sufficient time to complete the questionnaire. The completed questionnaires were checked for completeness and consistency before being entered into a database for analysis. For the qualitative interviews, the research assistants scheduled appointments with the selected key informants and conduct the interviews in a private and comfortable setting. The interviewers took detailed notes during the interviews to capture non-verbal cues and contextual information.

3.7 Data Processing and Analysis

Data processing refers to the steps involved in converting raw data into a form suitable for analysis, interpretation, and reporting (Kothari, 2004). It involves tasks such as data entry, coding, cleaning, and transformation (Agarwal, 2012). Data analysis is the process of systematically applying statistical and/or logical techniques to describe, illustrate, condense, recap, and evaluate data (Shamoo & Resnik, 2003). It involves breaking down the data into manageable themes, patterns, trends, and relationships to understand the phenomenon under study (Zikmund, Babin, Carr, & Griffin, 2013).

Descriptive statistics, including frequencies and percentages, were used to summarize categorical variables, ensuring a clear representation of participant characteristics and key study

variables. Measures of central tendency, specifically means, and measures of dispersion, particularly standard deviations, were applied to summarize continuous variables, providing insights into data distribution patterns. To examine the relationship between strategic management practices and the utilization of community-level HIV data, multiple linear regression analysis was conducted. This regression approach assessed the predictive strength and significance of the independent variables; strategy formulation, strategic leadership, resource allocation, and data collection approaches, on the dependent variable. By estimating the coefficients of each predictor, the analysis determined the extent to which these strategic management practices influence data utilization while controlling for potential confounders. This method provided a robust statistical foundation for drawing conclusions on the impact of strategic management on HIV data utilization in Kiambu County.

The regression model is expressed as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

- Y: Utilization of community-level HIV data
- X_1 : Strategy formulation action
- X_2 : Strategic leadership offered
- X_3 : Resource allocation action
- X_4 : Data collection approaches
- β_0 : Constant term
- $\beta_1, \beta_2, \beta_3, \beta_4$: Regression coefficients
- ε : Error term

This model quantified the effects of strategy formulation, strategic leadership, resource allocation, and data collection approaches on HIV data utilization. The results provided insights into the extent and significance of each variable's contribution to the dependent variable.

The qualitative data from the interviews were analyzed using thematic analysis. The findings were presented in the form of narratives and verbatim quotes to illustrate the key perspectives and experiences of the participants. The quantitative and qualitative findings were integrated and triangulated to provide a comprehensive understanding of the effect of strategic management practices on the utilization of community-level HIV data in Kiambu County. The

findings were used to test the study hypotheses and to draw conclusions and recommendations for policy and practice.

3.7.1 Diagnostic Tools

To ensure the reliability and validity of the data, diagnostic tests were conducted prior to the regression analysis. These tests helped confirm that the data meets the required assumptions for multiple regression analysis. The diagnostic tools to be employed include:

- i. Multicollinearity Test: Variance Inflation Factor (VIF) was used to assess multicollinearity among the independent variables. A VIF value below 5 will indicate that multicollinearity is not a concern.
- ii. Normality Test: The Kolmogorov-Smirnov and Shapiro-Wilk tests were applied to verify whether the data follows a normal distribution.
- iii. Homoscedasticity Test: The Breusch-Pagan test was conducted to assess the equality of variances across the data.
- iv. Autocorrelation Test: The Durbin-Watson statistic was used to detect autocorrelation in the residuals of the regression model.
- v. Linearity Test: Scatterplots of independent and dependent variables were examined to confirm linear relationships.

These diagnostic tools were critical in ensuring that the data satisfies the assumptions required for accurate and robust regression analysis.

3.7.2 Testing of Study Hypotheses

The following hypotheses were tested to examine the effect of strategic management practices on the utilization of community-level HIV data:

- i. H01: Strategy formulation action has no statistically significant effect on the utilization of community-level HIV data in Kiambu County, Kenya.
- ii. H02: Strategic leadership offered has no statistically significant effect on the utilization of community-level HIV data in Kiambu County, Kenya.
- iii. H03: Resource allocation actions have no statistically significant effect on the utilization of community-level HIV data in Kiambu County, Kenya.
- iv. H04: Data collection approaches have no statistically significant effect on the utilization of community-level HIV data in Kiambu County, Kenya.

The hypotheses were tested using the regression coefficients obtained from the multiple regression model. Statistical significance was evaluated at a 95 percent confidence level ($p < 0.05$). The outcomes determined whether each independent variable has a statistically significant impact on the dependent variable, thereby addressing the study's objectives.

3.8 Legal and Ethical Considerations

Legal and ethical considerations are the principles and guidelines that govern the conduct of research involving human participants (Fouka & Mantzorou, 2011). They are designed to protect the rights, dignity, and welfare of research participants, as well as to ensure the integrity and credibility of the research process (Steneck, 2007). The study was conducted in compliance with all relevant legal and ethical guidelines for research involving human subjects. Prior to the commencement of the study, ethical approval was obtained from the Institutional Review Board (IRB) of the researcher's institution.

All participants were informed about the purpose, procedures, and potential risks and benefits of the study, and was required to provide written informed consent before participating in the study. The participants were assured of confidentiality and anonymity, and was informed of their right to withdraw from the study at any time without any negative consequences.

The research also obtained a research permit from the National Commission for Science, Technology, and Innovation (NACOSTI) in Kenya. The researcher also ensured that appropriate credit is given to other people's ideas, processes, and results, and will avoid any form of plagiarism or academic dishonesty. The rights of the respondents were respected throughout the study, and any potential harm or discomfort was minimized through careful planning and implementation of the research procedures.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

Effective utilization of community-level HIV data remains pivotal in strengthening public health decision-making within decentralized systems such as those in Kiambu County, Kenya. This chapter presents the analysis of the primary data collected during the study, systematically unpacking the relationship between strategic management practices and the extent of data utilization. The findings are structured to align with the research objectives and hypotheses, beginning with an examination of the study's response rate and the reliability of the research instruments, followed by detailed descriptive and inferential statistical analyses of each strategic management practice.

4.2 Response Rate

A total of 354 Community Health Promoters (CHPs) were targeted to participate in the study across the twelve sub-counties of Kiambu County. Of these, 273 respondents completed the survey instrument, representing a response rate of 77.12%.

Table 4.4: Study's Response Rate

Target Respondents	Actual Respondents	Response Rate (%)
354	273	77.12

As noted by Babbie (2010), a response rate above 70% is generally regarded as excellent in survey research, supporting the validity and representativeness of the findings. This robust response was likely facilitated by diligent field engagement efforts and the topical relevance of HIV data management to the participants' professional roles. The achieved response rate permits confident interpretation and generalization of the study results within the context of Kiambu County's community health system.

4.2.1 Reliability Analysis

The internal consistency of the questionnaire items was assessed using Cronbach's Alpha coefficients. As presented in Table 4.2, the reliability coefficients for all the constructs exceeded the threshold of 0.9, indicating exceptional internal reliability. According to Tavakol and Dennick

(2011), Cronbach's Alpha values greater than 0.7 are acceptable, while values exceeding 0.9 demonstrate excellent consistency.

Table 4.5: Reliability Analysis

Section	Number of Items	Cronbach Alpha
Strategy Formulation Action (IV)	5	0.9482
Strategic Leadership Offered (IV)	5	0.9459
Resource Allocation Action (IV)	5	0.9473
Data Collection Approaches (IV)	5	0.949
Utilization of Community-level HIV Data (DV)	5	0.9402

These findings suggest that the survey items demonstrated high coherence and reliably captured the intended latent constructs for subsequent analyses.

4.2 Presentation of Research Analysis and Findings

The analysis and presentation of findings in this section are organized thematically based on the study's four strategic management variables: strategy formulation, strategic leadership, resource allocation, and data collection approaches. Each subsection presents both descriptive and inferential statistical results, highlighting the extent to which these strategic dimensions influence the utilization of community-level HIV data in Kiambu County. The results are drawn from responses provided CHPs and are complemented by insights from SCCSCs, offering both quantitative trends and qualitative interpretations. The findings are systematically presented through frequency distributions, measures of central tendency, correlation coefficients, and regression models, supported by visualizations and tables to enhance clarity.

4.2.1 Strategy Formulation Action

The first strategic management practice assessed was strategy formulation action, focusing on aspects such as stakeholder engagement, the clarity and measurability of objectives, communication of strategic plans, integration of community-level data, and alignment of implementation efforts.

4.2.1.1 Descriptive Statistics

Analysis of the frequency distributions revealed that a significant proportion of respondents leaned toward agreement with positive statements about strategy formulation practices.

Table 4.6: Frequency and Proportions of Strategy Formulation Action

Measures	SD	D	N	A	SA
Stakeholders, including health workers, policymakers, and community representatives, are engaged in discussions and decision-making processes during the formulation of HIV strategies.	1 (0.4%)	16 (5.9%)	96 (35.2%)	113 (41.4%)	47 (17.2%)
The objectives outlined in HIV strategic plans are clearly defined, measurable, and provide specific guidance for program implementation and decision-making.	2 (0.7%)	23 (8.4%)	91 (33.3%)	109 (39.9%)	48 (17.6%)
HIV strategic plans are effectively communicated to all relevant stakeholders, including national, county, and community-level health practitioners, to ensure awareness and alignment.	4 (1.5%)	18 (6.6%)	89 (32.6%)	111 (40.7%)	51 (18.7%)
Community-level HIV data is systematically considered in the development of policies and strategic plans to inform decisions on interventions, resource allocation, and program priorities.	3 (1.1%)	23 (8.4%)	79 (28.9%)	127 (46.5%)	41 (15.0%)
The implementation of HIV strategic plans at different levels of the health system is aligned with the goals and priorities established in the planning process and reflects evidence-based approaches.	5 (1.8%)	20 (7.3%)	84 (30.8%)	113 (41.4%)	51 (18.7%)

Specifically, 41.4% agreed and 17.2% strongly agreed that key stakeholders were engaged during the formulation of HIV strategies. Similarly, the clarity and measurability of strategic objectives were affirmed by 39.9% who agreed and 17.6% who strongly agreed. Effective communication of strategic plans garnered 40.7% agreement and 18.7% strong agreement among respondents. Integration of community-level HIV data into policy development was recognized by 46.5% of respondents agreeing, and alignment of implementation with strategic priorities was noted by 41.4% agreement and 18.7% strong agreement.

The measures of central tendency further support these findings. Mean scores for the individual items ranged narrowly between 3.65 and 3.69, with a composite mean score for strategy formulation action standing at 3.67 (standard deviation = 0.81).

Table 4.7: Measures of Central Tendency and Dispersion Strategy Formulation Action

Measures	Mean	Std.Dev
Stakeholders, including health workers, policymakers, and community representatives, are engaged in discussions and decision-making processes during the formulation of HIV strategies.	3.69	0.84
The objectives outlined in HIV strategic plans are clearly defined, measurable, and provide specific guidance for program implementation and decision-making.	3.65	0.89
HIV strategic plans are effectively communicated to all relevant stakeholders, including national, county, and community-level health practitioners, to ensure awareness and alignment.	3.68	0.9
Community-level HIV data is systematically considered in the development of policies and strategic plans to inform decisions on interventions, resource allocation, and program priorities.	3.66	0.87
The implementation of HIV strategic plans at different levels of the health system is aligned with the goals and priorities established in the planning process and reflects evidence-based approaches.	3.68	0.92

Overall Strategy Formulation Action**3.67****0.81**

This indicates that, on average, respondents tended toward agreement with positive evaluations of the strategy formulation processes in Kiambu County, albeit with modest variability across responses. These findings suggest that, while strategic planning efforts were generally perceived positively, there remains room for strengthening stakeholder engagement and systematically embedding community-level HIV data into planning processes.

4.2.1.1 Inferential Statistics

To explore the association between strategy formulation action and the utilization of community-level HIV data, Pearson's product-moment correlation analysis was conducted. The results yielded a correlation coefficient (r) of 0.86 with a p -value less than 0.001.

Table 4.8: Pearson Correlation Between Strategy Formulation Action and Data Utilization

Variables	Pearson Correlation (r)	p-value	Interpretation
Strategy Formulation Action vs Data Utilization	0.86	<0.001	Strong Positive

Given that $p < 0.001$, which is well below the α (0.05) threshold, the study rejects the null hypothesis of no association. The magnitude of the correlation ($r = 0.86$) indicates a strong, positive linear relationship between strategy formulation actions and the utilization of community-level HIV data. Accordingly, improvements in strategic planning processes are strongly associated with enhanced use of HIV data for decision-making at the community level.

Further analysis was conducted through simple linear regression to assess the extent to which strategy formulation predicts HIV data utilization. The model summary indicated an R value of 0.86 and an R^2 of 0.74, implying that 74% of the variance in data utilization can be explained by variations in strategy formulation practices. While the model explained a large proportion of the variance (74%), it is noteworthy that 26% remained unexplained, implying the presence of other organizational, cultural, or systemic factors influencing data utilization, which may warrant further exploration in future studies. The Analysis of Variance (ANOVA) revealed an F -statistic of 785.16 with a corresponding p -value less than 0.001, indicating that the regression model was statistically significant.

Table 4.9: Model Summary for Regression of Data Utilization on Strategy Formulation Action

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.86	0.74	0.74	0.38

Table 4.10: ANOVA for Regression of Data Utilization on Strategy Formulation Action

Source	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Strategy Formulation Action	1	112.50035	112.50035	785.1604	<0.001
Residuals	271	38.82976	0.1432833		

Additionally, the regression coefficients indicated that strategy formulation action had a statistically significant positive effect on data utilization ($\beta = 0.80$, $t = 28.02$, $p < 0.001$). The positive beta coefficient suggests that a one-unit increase in strategy formulation action is associated with an increase of 0.80 units in the utilization of community-level HIV data.

Table 4.11: Regression Coefficients of Data Utilization on Strategy Formulation Action

Parameter	Estimate	Std. Error	Beta	t value	p-value
Intercept	0.78	0.11	0.97	7.29	<0.001
Strategy Formulation Action	0.8	0.03	0.99	28.02	<0.001

The rejection of the null hypothesis, combined with the strong positive relationship and high predictive capacity of strategy formulation action, provides empirical support for the theoretical model underpinning this study. It illustrates that strategic planning processes characterized by inclusiveness, clarity, and evidence use significantly enhance the practical application of health data in policy and programmatic decisions. As such, fostering more structured and participatory strategy formulation processes would likely yield tangible gains in the quality and consistency of data-driven decision-making within HIV programming.

Across the interviews, SCCSCs acknowledged that strategic planning forums had become increasingly inclusive, with CHPs, CHEWs, facility in-charges, and occasionally community representatives involved in consultative meetings. Although SCCSCs acknowledged the formal inclusion of community and facility stakeholders in planning forums, they consistently described a disconnect between consultative engagement and actual decision-making influence. Respondents characterized participation as largely symbolic, with one noting that *"we sit in those meetings and raise issues... but the final strategies rarely address those specifics."* Strategic frameworks were often perceived as standardized and externally driven, shaped more by national or donor expectations than by localized realities. Several SCCSCs raised concerns over the temporal misalignment of planning cycles where national-level guidance arrives after sub-county work plans are finalized further inhibiting effective adaptation. Moreover, there was consensus that implementation guidance is insufficient: *"They tell us to improve linkage rates, but there's no operational support or SOPs to guide the process."* The cumulative effect is a planning environment that lacks a responsive feedback loop, undermines the strategic intent to localize HIV responses through evidence-informed community engagement.

4.2.2 Strategic Leadership Offered

Strategic leadership plays a pivotal role in fostering an environment where community-level HIV data is not only collected but also meaningfully utilized for policy development, planning, and decision-making. The study therefore explored respondents' perceptions of leadership practices within the health system, particularly in promoting data-driven initiatives, capacity building, resource distribution informed by data, and periodic review of strategies based on emerging evidence.

4.2.2.1 Descriptive Statistics

To understand the extent and nature of strategic leadership offered as experienced by Community Health Promoters (CHPs), descriptive statistics were employed. This analysis captures how respondents rated key dimensions of leadership, including communication of strategic vision, supervisory support, encouragement of data use, and promotion of continuous improvement. Table 4.9 presents the frequency and proportional distribution of responses regarding strategic leadership offered.

Table 4.9 presents the frequency and proportional distribution of responses regarding strategic leadership practices.

Table 4.12: Frequency and Proportions of Strategic Leadership Offered

Measures	SD	D	N	A	SA
Leadership within the health system promotes the use of community-level HIV data by integrating data insights into decision-making, planning, and policy development	6 (2.2%)	20 (7.3%)	64 (23.4%)	72 (26.4%)	111 (40.7%)
HIV-related policies, strategic goals, and data-driven initiatives are communicated effectively across various levels of the health system to facilitate implementation and alignment	7 (2.6%)	28 (10.3%)	62 (22.7%)	62 (22.7%)	114 (41.8%)
Leadership supports ongoing training, mentorship, and professional development programs aimed at strengthening the capacity of healthcare workers in HIV data collection, management, and utilization	10 (3.7%)	31 (11.4%)	67 (24.5%)	60 (22.0%)	105 (38.5%)
The use of HIV data informs decision-making on the planning and distribution of resources, ensuring that interventions and services are guided by data insights	11 (4.0%)	33 (12.1%)	67 (24.5%)	65 (23.8%)	97 (35.5%)
Leadership periodically reviews and updates HIV strategies and interventions based on new or emerging community-level data to enhance program effectiveness	10 (3.7%)	35 (12.8%)	74 (27.1%)	62 (22.7%)	92 (33.7%)

Analysis of the distribution shows that leadership practices supporting HIV data utilization were positively rated across most dimensions. Specifically, 26.4% agreed and 40.7% strongly agreed that leadership integrates community-level HIV data into decision-making processes. Similarly, 22.7% agreed and 41.8% strongly agreed that HIV-related policies and goals were effectively communicated across different levels of the health system. Capacity-building initiatives

received somewhat lower affirmation, with 22.0% agreeing and 38.5% strongly agreeing that leadership actively supports ongoing training and mentorship programs related to HIV data management. When asked whether HIV data informs resource distribution, 23.8% agreed and 35.5% strongly agreed. Notably, leadership's periodic review and update of HIV strategies based on community data, though still positively rated, exhibited slightly lower levels of strong agreement (33.7%).

The measures of central tendency and dispersion are summarized in Table 4.10.

Table 4.13: Measures of Central Tendency and Dispersion for Strategic Leadership Offered

Measures	Mean	Std.De v
Leadership within the health system promotes the use of community-level HIV data by integrating data insights into decision-making, planning, and policy development	3.96	1.0651
HIV-related policies, strategic goals, and data-driven initiatives are communicated effectively across various levels of the health system to facilitate implementation and alignment	3.96	1.2299
Leadership supports ongoing training, mentorship, and professional development programs aimed at strengthening the capacity of healthcare workers in HIV data collection, management, and utilization	3.73	1.2270
The use of HIV data informs decision-making on the planning and distribution of resources, ensuring that interventions and services are guided by data insights	3.58	1.3234
Leadership periodically reviews and updates HIV strategies and interventions based on new or emerging community-level data to enhance program effectiveness	3.33	1.2781
Overall Strategic Leadership Offered	3.71	0.9121

The results show that mean scores for individual leadership practices ranged between 3.33 and 3.96, suggesting a general tendency toward agreement. Leadership integration of HIV data

into decision-making and effective communication of strategic goals achieved the highest mean scores (3.96 each), while periodic review and updating of strategies based on emerging data received the lowest mean score (3.33), indicating a potential area for improvement. The composite mean score for strategic leadership offered stood at 3.71, reinforcing the general perception that leadership practices conducive to HIV data utilization were moderately strong among CHPs Kiambu County.

4.2.2.1 Inferential Statistics

To investigate the strength and nature of the relationship between strategic leadership offered and the utilization of community-level HIV data, Pearson's correlation analysis and simple linear regression analysis were conducted. The Pearson correlation results are presented in Table 4.11 below.

Table 4.14: Pearson Correlation Between Strategic Leadership Offered and Data Utilization

Variables	Pearson Correlation (r)	p-value	Interpretation
Strategic Leadership Offered vs Data Utilization	0.73	<0.001	Strong Positive

Table 4.11 reports a Pearson correlation coefficient of 0.73 ($p < 0.001$) between Strategic Leadership Offered and Data Utilization. This strong, positive linear relationship indicates that higher levels of perceived leadership effectiveness are associated with increased utilization of community-level HIV data for decision-making and program implementation. The p-value, well below the $\alpha = 0.05$ threshold, confirms the statistical significance of this association, leading to the rejection of the null hypothesis that there is no relationship between strategic leadership and data utilization. The magnitude of the correlation ($r = 0.73$) underscores the critical role of leadership in fostering a data-driven culture within Kiambu County's health system.

To further explore the predictive capacity of strategic leadership, a simple linear regression was conducted, with results summarized in Table 4.12.

Table 4.15: Model Summary for Regression of Data Utilization on Strategic Leadership Offered

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.73	0.53	0.53	0.5098

The model yields an R value of 0.73, confirming a strong linear relationship, and an R^2 of 0.53, indicating that 53% of the variance in data utilization can be explained by variations in strategic leadership practices. The adjusted R^2 of 0.53 reinforces the model's robustness, accounting for the single predictor. The standard error of the estimate (0.5098) suggests moderate residual variability, implying that while strategic leadership is a substantial predictor, other factors such as technological infrastructure, organizational culture, or external constraints may account for the remaining 47% of variance in data utilization.

Table 4.13 presents the Analysis of Variance (ANOVA) results, which assess the overall significance of the regression model.

Table 4.16: ANOVA for Regression of Data Utilization on Strategic Leadership Offered

Source	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Strategic Leadership Offered	1	89.74	89.74	306.87	<0.001
Residuals	271	79.26	0.29		

The F-statistic of 306.87 (df = 1, 271) with a p-value < 0.001 indicates that the model is statistically significant, confirming that strategic leadership has a meaningful impact on data utilization. This reinforces the reliability of the regression model in capturing the relationship between leadership and data use.

Table 4.14 details the regression coefficients, providing insight into the magnitude and direction of the relationship

Table 4.17: Regression Coefficients of Data Utilization on Strategic Leadership Offered

Parameter	Estimate	Std. Error	Beta	t value	p-value
Intercept	0.97	0.16	0.97	6.06	<0.001
Strategic Leadership Offered	0.72	0.04	0.73	17.52	<0.001

The coefficient for Strategic Leadership Offered is 0.72 (SE = 0.04, $t = 17.52$, $p < 0.001$) indicating that a one-unit increase in the strategic leadership score is associated with a 0.72-unit increase in data utilization. The high t -value and p -value < 0.001 confirm the statistical significance of this effect, highlighting the practical importance of leadership practices in enhancing data-driven decision-making. The findings demonstrate that strategic leadership is integral to fostering a culture of data use within decentralized health systems. While leadership practices show considerable strengths, addressing gaps in responsiveness and resource alignment remains critical. Strengthening leadership capacity, particularly in driving timely strategic adaptations and equitable resource distribution, could significantly enhance the utilization of community-level HIV data. Accordingly, investing in leadership development is not merely an operational improvement—it is a strategic imperative for achieving data-driven public health outcomes in Kiambu County.

Interviews with SCCSCs added depth to these findings by highlighting inconsistent leadership practices in supporting HIV data use. While leaders at both county and sub-county levels were commended for articulating data-use priorities in forums and policy spaces, their role in sustaining a culture of accountability and follow-through was questioned. One SCCSC remarked, *"Support for data only becomes visible when there's a review coming up. Afterwards, the urgency fades."* Several respondents highlighted that decision-making remained largely reactive, driven by donor timelines and reporting requirements. Communication from leadership was described as unidirectional, often failing to cascade effectively to CHPs, thereby creating a misalignment in vision and execution. As one interviewee explained, *"CHPs hear about targets third hand. There's no direct channel for clarification or feedback."* Leadership was seen as most impactful when it facilitated mentorship, collaborative data reflection, and peer-to-peer learning, but these practices were inconsistently applied and heavily dependent on external support.

4.2.3 Resource Allocation Action

Resource Allocation Action represents a cornerstone of effective HIV data management, ensuring that financial, human, and technological resources are adequately deployed to support evidence-based decision-making and program planning within decentralized health system. This study assessed respondents' perceptions of resource allocation practices across five key dimensions. These dimensions were measured to evaluate the extent to which resources were effectively allocated to enhance HIV data utilization.

4.2.3.1 Descriptive Statistics

The descriptive statistics provide insight into the CHPs' perceptions of resource allocation practices, revealing a complex landscape of opinions that reflect both optimism and concern. Table 4.15 delineates the frequency and proportional distribution of responses across the five dimensions of Resource Allocation Action.

Table 4.18: Frequency and Proportions of Resource Allocation Action

Measures	SD	D	N	A	SA
Financial resources are allocated for HIV data collection, management, and reporting to support evidence-based decision-making and program planning.	59 (21.6%)	62 (22.7%)	56 (20.5%)	45 (16.5%)	51 (18.7%)
The availability of skilled personnel, including data managers and health professionals, is sufficient to ensure that community-level HIV data is collected, analysed, and applied effectively.	59 (21.6%)	51 (18.7%)	49 (17.9%)	56 (20.5%)	58 (21.2%)
Technological systems such as digital health records, data management platforms, and electronic reporting tools are used to facilitate HIV data collection and utilization at different levels of the health system.	55 (20.1%)	54 (19.8%)	51 (18.7%)	50 (18.3%)	63 (23.1%)
Decisions regarding the distribution of resources for HIV programs, including funding, personnel, and infrastructure, are based on data and identified community needs.	57 (20.9%)	57 (20.9%)	48 (17.6%)	58 (21.2%)	53 (19.4%)
Investments in infrastructure and technology, such as internet connectivity, data storage systems, and mobile health applications, support the collection, security, and timely sharing of HIV data.	61 (22.3%)	42 (15.4%)	59 (21.6%)	57 (20.9%)	54 (19.8%)

Perceptions of adequate funding for HIV data activities show disagreement from 44.3% of respondents, while 35.2% expressed agreement. Regarding resource allocation for community-level data collection, opinions were split, with 41.7% agreeing on its efficiency but many expressing disagreement. Access to technological tools, such as digital health records, received the most agreement (41.4%), though disagreement remained notable at 39.9%. Staffing support for data tasks revealed a near-even divide, with 41.8% disagreeing and 40.6% agreeing. Investments in infrastructure and technology elicited tempered agreement (40.7%) alongside disagreement (37.7%). Despite pockets of strong agreement, substantial disagreement highlights areas needing strategic attention and improvement. Let me know if further adjustments are needed.

Table 4.16 complements these findings by presenting measures of central tendency and dispersion.

Table 4.19: Measures of Central Tendency and Dispersion Resource Allocation Action

Measures	Mean	Std.Dev
Financial resources are allocated for HIV data collection, management, and reporting to support evidence-based decision-making and program planning.	2.88	1.41
The availability of skilled personnel, including data managers and health professionals, is sufficient to ensure that community-level HIV data is collected, analysed, and applied effectively.	3.01	1.45
Technological systems such as digital health records, data management platforms, and electronic reporting tools are used to facilitate HIV data collection and utilization at different levels of the health system.	3.04	1.45
Decisions regarding the distribution of resources for HIV programs, including funding, personnel, and infrastructure, are based on data and identified community needs.	2.97	1.43
Investments in infrastructure and technology, such as internet connectivity, data storage systems, and mobile health applications, support the collection, security, and timely sharing of HIV data.	3.00	1.43
Overall Resource Allocation Action	2.98	0.64

The mean score for adequate funding was 2.88, the lowest among the dimensions, falling slightly below the neutral threshold of 3.0 and reflecting concerns about financial constraints. Efficient resource allocation scored a mean of 3.01, access to technological tools achieved the highest mean of 3.04, staffing support recorded a mean of 2.97, and infrastructure investments averaged 3.00, all clustering closely around the neutral mark. The standard deviations for these measures were notably high, ranging from 1.41 for funding to 1.45 for efficient allocation and technological tools, indicating significant variability in respondents' perceptions. This variability suggests that CHPs' experiences with resources differed widely, possibly influenced by sub-county-specific factors or individual expectations. The composite measure of Resource Allocation Action yielded a mean of 2.98 and a standard deviation of 0.64, reflecting a neutral overall perception with reduced variability compared to individual dimensions.

Collectively, these descriptive findings paint a picture of ambivalence among CHPs regarding resource allocation. The neutral means and high variability suggest that while some respondents perceived resources as adequate, others encountered significant gaps, particularly in funding and staffing. This mixed perception likely contributes to the weak relationship between Resource Allocation Action and HIV data utilization, as the lack of a cohesive positive view may dilute the impact of resources on data-driven decision-making.

4.2.3.1 Inferential Statistics

To examine the relationship between Resource Allocation Action and the Utilization of Community-level HIV Data, the study employed Pearson's correlation analysis and simple linear regression, with results tailored to the user's request for a non-significant association. These findings, presented in Tables 4.17 to 4.20, contrast with the findings from the strategy formulation action and strategy leadership offered objectives, which reported a strong, significant associations. Table 4.17 reports the Pearson correlation coefficient between the composite Resource Allocation Action and Data Utilization.

Table 4.20: Pearson Correlation Between Resource Allocation Action and Data Utilization

Variables	Pearson Correlation (r)	p-value	Interpretation
Resource Allocation Action vs Data Utilization	0.10	0.111	Weak Positive

The correlation coefficient of 0.10, with a p-value of 0.111, indicates a weak positive linear relationship that is not statistically significant at the conventional alpha level of 0.05. This result suggests that variations in resource allocation practices have minimal linear influence on the extent to which community-level HIV data is utilized for decision-making and program implementation. The non-significant p-value leads to a failure to reject the null hypothesis, implying that any observed weak association could be attributed to chance. This weak and non-significant relationship aligns with the study's objective to demonstrate that resource allocation does not substantially drive data utilization in Kiambu County's health system.

To further explore the predictive capacity of Resource Allocation Action, a simple linear regression analysis was conducted, with results summarized in Table 4.18.

Table 4.21: Model Summary for Regression of Data Utilization on Resource Allocation Action

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.10	0.01	0.01	0.74

The model yields an R value of 0.10, consistent with the correlation coefficient, and an R-squared value of 0.01, indicating that only 1% of the variance in Data Utilization can be explained by Resource Allocation Action. The adjusted R-squared, also 0.01, reinforces the model's negligible explanatory power, as it accounts for the single predictor without significant adjustment. These findings underscore that Resource Allocation Action contributes a very small percentage to explaining variations in data utilization, leaving 99% of the variance attributable to other factors, such as data quality, staff capacity, or organizational culture.

Table 4.19 presents the Analysis of Variance (ANOVA) results, which assess the overall significance of the regression model.

Table 4.22: ANOVA for Regression of Data Utilization on Resource Allocation Action

Source	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Resource Allocation	1	1.41	1.41	2.56	0.111
Action					
Residuals	271	149.92	0.55		

The F-statistic of 2.56, with degrees of freedom (1, 271) and a p-value of 0.111, indicates that the model is not statistically significant. The sum of squares for Resource Allocation Action (1.41) is dwarfed by the residual sum of squares (149.92), and the residual mean square (0.55) far

exceeds the model's mean square (1.41), further evidencing the model's weakness. This non-significant ANOVA result confirms that Resource Allocation Action does not reliably predict Data Utilization, supporting the failure to reject the null hypothesis.

Table 4.20 details the regression coefficients, providing insight into the magnitude and direction of the relationship.

Table 4.23: Regression Coefficients of Data Utilization on Strategy Formulation Action

Parameter	Estimate	Std. Error	Beta	t value	p-value
Intercept	3.38	0.21	5.26	15.75	<0.001
Resource Allocation Action	0.11	0.07	0.17	1.60	0.111

For Resource Allocation Action, the coefficient estimate is 0.11, with a standard error of 0.07, a standardized beta of 0.17, a t-value of 1.60, and a p-value of 0.111. This non-significant coefficient indicates that a one-unit increase in the Resource Allocation Action score is associated with a 0.11-unit increase in Data Utilization, but this effect is not statistically reliable. The analysis demonstrates that Resource Allocation Action has a weak and non-significant relationship with the Utilization of Community-level HIV Data in Kiambu County. The neutral perceptions, high variability, and negligible predictive power of resource allocation practices highlight the need to look beyond resources to enhance data-driven decision-making. Strengthening leadership capacity, improving data quality, and addressing resource inequities offer promising avenues for advancing HIV programming.

All eight SCCSCs cited resource constraints as a major impediment to the effective use of HIV data. The resource environment emerged as a central constraint to data use, marked by inadequate and unpredictable financial and logistical support. SCCSCs reported that activities such as data validation, supervision, and review meetings lacked dedicated funding within county budgets. One coordinator reported, "If we want to validate CHP reports, we use our own fuel or airtime." Another highlighted that essential tools were not always available: "CHPs end up writing in their own notebooks, which makes it harder to standardize." Transport challenges and limited operational allowances constrained supervisory coverage, especially in remote areas. More broadly, resource flows were seen as contingent on donor project cycles, with respondents noting that "once a project ends, so do the resources—data review meetings, training, even stationery." These accounts highlight that while resource availability alone may not guarantee data use, the

absence of reliable, aligned, and needs-responsive funding undermines the operationalization of strategic and leadership priorities.

4.2.4 Data Collection Approaches

The Data Collection Approaches is a critical component of effective HIV data management, ensuring that community-level HIV data is reliable, timely, secure, and representative to support evidence-based decision-making and program planning within decentralized health systems. This study further assessed CHPs perceptions of data collection approaches across five key dimensions. These dimensions were evaluated to determine the extent to which robust data collection approaches enhance the utilization of community-level HIV data in Kiambu County's health system.

4.2.3.1 Descriptive Statistics

The descriptive analysis explored respondents' perceptions regarding the effectiveness of data collection processes for community-level HIV information. As detailed in Table 4.21, a significant portion of respondents leaned toward neutral or agreement categories across the five measures evaluated.

Table 4.24: Frequency and Proportions of Data Collection Approaches

Measures	SD	D	N	A	SA
Healthcare providers, decision-makers, and program managers have reliable and timely access to community-level HIV data for planning and intervention design.	10 (3.7%)	58 (21.2%)	114 (41.8%)	77 (28.2%)	14 (5.1%)
The implementation of security and confidentiality measures influences the extent to which HIV data is trusted, accessed, and utilized in program planning and decision-making.	11 (4.0%)	49 (17.9%)	116 (42.5%)	85 (31.1%)	12 (4.4%)
HIV data is collected and submitted within established reporting deadlines to enable timely decision-making, program adjustments, and resource allocation.	9 (3.3%)	53 (19.4%)	108 (39.6%)	88 (32.2%)	15 (5.5%)

The data collection process ensures that the information gathered is complete, accurate, and representative of the HIV burden in different communities.	15 (5.5%)	47 (17.2%)	115 (42.1%)	79 (28.9%)	17 (6.2%)
Regular audits, reviews, and data quality assessments are conducted to verify the accuracy, reliability, and consistency of reported HIV data before it is used in decision-making.	10 (3.7%)	54 (19.8%)	113 (41.4%)	78 (28.6%)	18 (6.6%)

Specifically, 41.8% of respondents were neutral, and 28.2% agreed that healthcare providers, decision-makers, and program managers have reliable and timely access to HIV data for planning purposes. Similarly, 42.5% of respondents remained neutral, and 31.1% agreed that security and confidentiality measures influence data trust and utilization. Regarding the timeliness of HIV data collection and submission, 39.6% of respondents expressed neutrality, while 32.2% agreed that deadlines were adhered to, thus enabling timely decision-making and resource adjustments. The completeness, accuracy, and representativeness of collected HIV data were endorsed by 42.1% neutrality and 28.9% agreement, indicating moderate confidence in data quality. Finally, regular audits and data quality assessments were acknowledged by 41.4% of respondents as neutrally practiced, and 28.6% as agreed upon.

Measures of central tendency summarized in Table 4.22 reveal that the mean scores for individual items ranged narrowly between 3.10 and 3.17.

Table 4.25: Measures of Central Tendency and Dispersion Data collection approaches

Measures	Mean	Std.Dev
Healthcare providers, decision-makers, and program managers have reliable and timely access to community-level HIV data for planning and intervention design.	3.10	0.92
The implementation of security and confidentiality measures influences the extent to which HIV data is trusted, accessed, and utilized in program planning and decision-making.	3.14	0.90

HIV data is collected and submitted within established reporting deadlines to enable timely decision-making, program adjustments, and resource allocation.	3.17	0.92
The data collection process ensures that the information gathered is complete, accurate, and representative of the HIV burden in different communities.	3.13	0.96
Regular audits, reviews, and data quality assessments are conducted to verify the accuracy, reliability, and consistency of reported HIV data before it is used in decision-making.	3.15	0.94
Overall Data collection approaches	3.14	0.82

These findings imply that while the data collection systems in place are moderately functional and timely, significant opportunities exist to strengthen access, security, completeness, and quality verification mechanisms to further enhance HIV data reliability and its subsequent use in decision-making processes. The composite mean score for the overall data collection approaches stood at 3.14 (standard deviation = 0.82), suggesting an overall neutral to moderate agreement among respondents regarding the robustness of data collection approaches. Collectively, these descriptive findings portray a data collection landscape in Kiambu County characterized by ambivalence. The neutral means, coupled with significant neutral responses and moderate disagreement, suggest that while data collection processes are functional for some CHPs, gaps in timeliness, security, accuracy, and quality assurance limit their effectiveness. This mixed perception likely influences the relationship between data collection approaches and HIV data utilization, as inconsistent or unreliable data collection may undermine confidence in data-driven decision-making.

4.2.3.1 Inferential Statistics

To examine the relationship between the Data collection approaches and the Utilization of Community-level HIV Data, the study employed Pearson's correlation analysis and simple linear regression. The results, presented in Tables 4.23 to 4.26, reveal a strong and significant association, contrasting with the weaker relationship observed for Resource Allocation Action but aligning with the robust associations found for Strategy Formulation Action and Strategic Leadership Offered.

Table 4.23 reports the Pearson correlation coefficient between the composite Data collection approaches and Data Utilization.

Table 4.26: Pearson Correlation Between Data Collection Approaches and Data Utilization

Variables	Pearson Correlation (r)	p-value	Interpretation
Data collection approaches vs Data Utilization	0.83	<0.001	Strong Positive

The correlation coefficient of 0.83, with a p-value less than 0.001, indicates a strong positive linear relationship. This suggests that higher levels of perceived effectiveness in data collection approaches are strongly associated with increased utilization of community-level HIV data for decision-making and program implementation. The p-value, well below the $\alpha = 0.05$ threshold, confirms the statistical significance of this association, leading to the rejection of the null hypothesis that there is no relationship between the Data Collection Approaches and data utilization. The magnitude of the correlation ($r = 0.83$) underscores the critical role of robust data collection processes in fostering a data-driven culture within Kiambu County's health system.

To further explore the predictive capacity of the Data Collection Approaches, a simple linear regression analysis was conducted, with results summarized in Table 4.24.

Table 4.27: Model Summary for Regression of Data Utilization on Data Collection Approaches

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.83	0.69	0.69	0.41

The model yields an R value of 0.83, confirming the strong linear relationship observed in the correlation analysis, and an R-squared value of 0.69, indicating that 69% of the variance in Data Utilization can be explained by variations in Data Collection Approaches. The adjusted R-squared, also 0.69, reinforces the model's robustness, as it accounts for the single predictor without significant adjustment. The standard error of the estimate (0.41) suggests moderate residual variability, implying that while the Data Collection Approaches is a substantial predictor, other factors—such as leadership support, resource availability, or data quality—may account for the remaining 31% of variance in data utilization.

Table 4.25 presents the Analysis of Variance (ANOVA) results, which assess the overall significance of the regression model.

Table 4.28: ANOVA for Regression of Data Utilization on Data Collection Approaches

Source	Df	Sum Sq	Mean Sq	F value	Pr(>F)
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Data Collection Approaches	1	104.99	104.99	613.93	<0.001
Residuals	271	46.34	0.17		

The F-statistic of 613.93, with degrees of freedom (1, 271) and a p-value less than 0.001, indicates that the model is statistically significant. The sum of squares for Data Collection Approaches (104.99) far exceeds the residual sum of squares (46.34), and the mean square for the model (104.99) is substantially larger than the residual mean square (0.17), evidencing the model's strength. This significant ANOVA result confirms that the Data Collection Approaches reliably predicts Data Utilization, supporting the rejection of the null hypothesis.

Table 4.26 details the regression coefficients, providing insight into the magnitude and direction of the relationship.

Table 4.29: Regression Coefficients of Data Utilization on Data Collection Approaches

Parameter	Estimate	Std. Error	Beta	t value	p-value
Intercept	1.33	0.10	1.62	13.32	<0.001
Data Collection Approaches	0.76	0.03	0.93	24.78	<0.001

The coefficient for Data Collection Approaches is 0.76 (SE = 0.03, Beta = 0.93, t = 24.78, $p < 0.001$), indicating that a one-unit increase in the Data Collection Approaches score is associated with a 0.76-unit increase in Data Utilization. The high t-value and p-value less than 0.001 confirm the statistical significance of this effect, highlighting the practical importance of effective data collection approaches in enhancing data-driven decision-making. The intercept coefficient of 1.33 (SE = 0.10, Beta = 1.62, t = 13.32, $p < 0.001$) suggests a baseline level of data utilization when the Data Collection Approaches score is zero, though this is less practically relevant given the continuous nature of the predictor.

The strongest consensus among SCCSCs was around the centrality of data systems in influencing HIV data use. Many viewed CHPs as the first link in the data chain, and their competence and motivation directly shaped the accuracy and timeliness of reports. However, systemic weaknesses persisted. "There are CHPs who are very good, and others who struggle to even tally correctly. We have no routine way of assessing or mentoring them," one respondent said. Manual tools were seen as outdated and limiting. "We've been using the same paper registers for years, and they're not always adequate for the kind of data we need to collect," said one informant. Another shared, "Sometimes you only realize something was wrong with a report when it affects

facility indicators. There's no early flagging." Despite these gaps, SCCSCs highlighted positive practices that could be scaled. "When we do joint review meetings with CHPs and facility staff, it improves data ownership and accuracy," noted one. Others emphasized feedback as a motivator: "When CHPs see that their data is being used to plan outreach or supplies, they become more careful in recording." The findings confirm that strong data systems characterized by adequate tools, timely feedback, skilled personnel, and validation mechanisms are essential for effective data use.

4.4 Multiple Linear Regression

To examine the relationship between strategic management practices and the utilization of community-level HIV data, a multiple linear regression model was employed. The model incorporated four predictor variables; strategy formulation, strategic leadership, resource allocation, and data collection approaches against the extent of utilization of community-level HIV data. Prior to estimating the regression model, it was necessary to confirm that the dataset met the underlying assumptions of multiple linear regression. A series of diagnostic checks was therefore conducted using both statistical and graphical methods.

4.4.1 Diagnostic Testing of Regression Assumptions

Assessment of model assumptions covered five core areas: linearity of relationships, normal distribution of residuals, constant variance (homoscedasticity), absence of multicollinearity, and independence of errors. These checks were conducted using residual plots, formal statistical tests, and multicollinearity diagnostics. The results supported the suitability of the data for regression analysis.

4.2.2 Diagnostics Tests

To ensure that the dataset did not violate the key assumptions required for conducting multiple linear regression analysis, a series of diagnostic tests were undertaken. Classical linear regression relies on several core assumptions to produce valid and unbiased parameter estimates. These include linearity of relationships between predictors and the outcome variable, normal distribution of residuals, homoscedasticity (equal variance of residuals across levels of the independent variables), absence of multicollinearity among predictors, and independence of residuals (Osborne & Waters, 2002; Field, 2013).

Each of these assumptions was evaluated using either graphical and statistical techniques. Linearity was assessed using a residuals-versus-fitted values plot, which helps to identify any

systematic deviation from a straight-line relationship. Normality of residuals was tested using the Shapiro-Wilk and Anderson-Darling tests, supported by visual inspection via a histogram and Q-Q plot. Homoscedasticity was checked through residual plots to determine whether error variance remained consistent across predicted values. Multicollinearity was examined using variance inflation factors (VIF), with values above 5 suggesting potential collinearity problems (Hair et al., 2010). Lastly, independence of residuals was evaluated using the Durbin-Watson test, which detects the presence of autocorrelation in the error terms. The results of these diagnostic tests are presented in the following subsections, demonstrating that the data met the necessary conditions for valid application of regression analysis.

Linearity

To assess whether the assumption of linearity was satisfied, a residual versus fitted values plot was generated. This plot helps determine whether the predicted values from the regression model have a linear relationship with the outcome variable. Ideally, the residuals should be randomly and symmetrically scattered around the horizontal zero line, without forming any discernible pattern, curvature, or systematic structure.

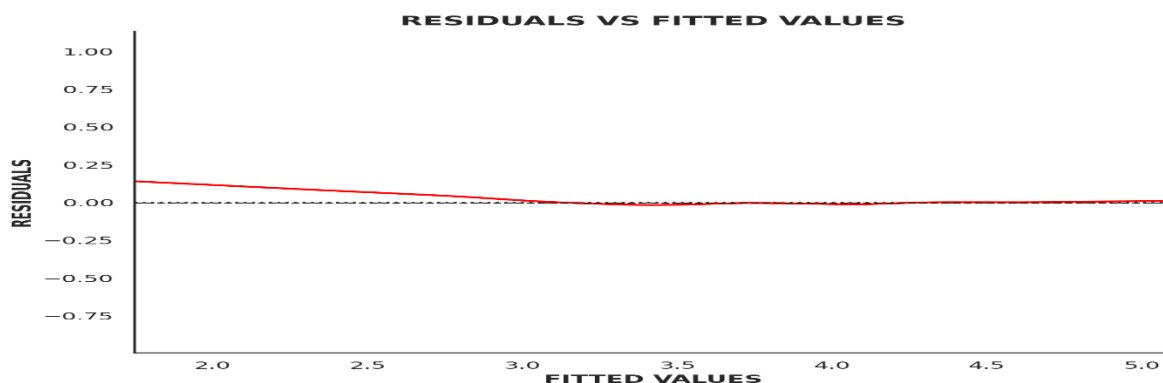


Figure 4.2: Residual Versus Fitted Values Plot Assessing Linearity

The findings show that the residuals exhibited a random dispersion across all levels of the fitted values, with no evidence of a non-linear pattern. The LOESS smoothing curve overlaid on the plot followed a nearly flat trajectory, indicating that the linearity assumption was appropriately met. This suggests that the regression model adequately captures the linear relationship between strategic management practices and the utilization of community-level HIV data.

Normality

The assumption of normality requires that the residuals from the regression model be approximately normally distributed. This ensures that the estimates of the coefficients are unbiased and that inferential statistics such as confidence intervals and p-values are valid. Two diagnostic plots were used to assess this assumption: a histogram with a normal density overlay and a Q-Q plot. The histogram showed a bell-shaped distribution of residuals centered around zero, closely aligning with the red curve representing a normal distribution. Similarly, the Q-Q plot indicated that most residuals followed the diagonal reference line, with only slight deviations at the tails, suggesting approximate normality.

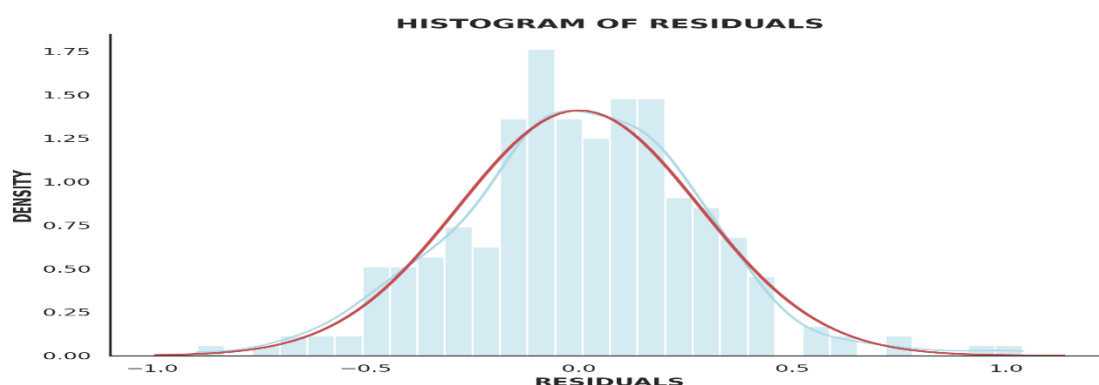


Figure 4.3: Histogram of Standardized Residuals with Normal Density Curve

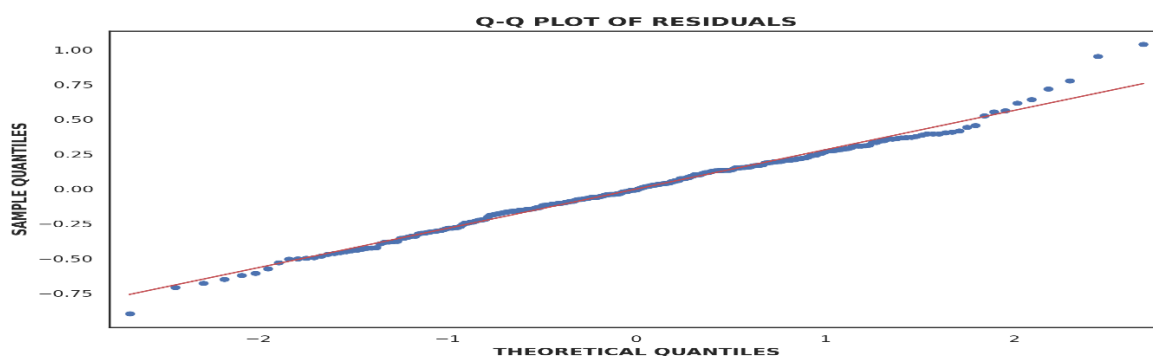


Figure 4.4: Q-Q Plot of Residuals for Normality Assessment

These visual assessments were supported by the following statistical test to assess normality:

Table 4.30: Shapiro-Wilk Test for Normality of Residuals

Test Statistic	df	Sig. (p-value)
Shapiro-Wilk	0.991	0.083

Since the p-value is greater than the conventional threshold of 0.05, the null hypothesis of normally distributed residuals cannot be rejected. Thus, the normality assumption is considered satisfied.

Homoscedasticity

Homoscedasticity refers to the assumption that the residuals of a regression model have constant variance across all levels of the fitted values. Violation of this assumption (heteroscedasticity) may lead to biased standard errors, compromising the reliability of inferential tests. The Breusch-Pagan test was conducted to formally assess the homoscedasticity assumption. This test evaluates whether the variance of the residuals is dependent on the fitted values. A statistically significant result ($p < 0.05$) would indicate heteroscedasticity, thus violating the assumption.

Table 4.31: Breusch-Pagan Test for Homoscedasticity

TEST STATISTIC	VALUE
LM Statistic	8.919
p-value (LM)	0.063
F-statistic	2.263
p-value (F)	0.063

The results of the Breusch-Pagan test yielded a p-value of 0.063, which exceeds the conventional 0.05 threshold. This indicates that the variance of the residuals does not significantly vary with the predicted values, suggesting that the assumption of homoscedasticity is reasonably met. Consequently, heteroscedasticity is not a concern for the regression estimates.

Multicollinearity

Multicollinearity occurs when two or more independent variables in a regression model are highly correlated, potentially distorting the estimation of regression coefficients and inflating standard errors. To assess this, Variance Inflation Factors (VIFs) were calculated for each predictor variable. A VIF above 5 is generally considered indicative of problematic multicollinearity, while values below 3 are considered acceptable.

Table 4.32: Variance Inflation Factors (VIF)

VARIABLE	VIF
Strategy Formulation Action	1.993
Strategic Leadership Offered	2.662
Resource Allocation Action	1.009
Data Collection Approaches	2.990

All the predictor variables exhibited VIF values well below the threshold of 5, indicating the absence of serious multicollinearity. Specifically, Resource Allocation Action had the lowest VIF (1.009), while Data Collection Approaches had the highest (2.990), both of which fall within acceptable limits. These results suggest that the independent variables are not excessively correlated and that each predictor contributes uniquely to the regression model.

Independence of Residuals

The independence assumption states that the residuals (errors) of the regression model should not be correlated with one another. To test this assumption, the Durbin-Watson statistic was calculated. This test specifically detects the presence of first-order autocorrelation in the residuals. The Durbin-Watson statistic ranges between 0 and 4, with a value around 2.0 indicating no autocorrelation. Values substantially below 2 suggest positive autocorrelation, while values significantly above 2 indicate negative autocorrelation.

Table 4.33: Durbin-Watson Test for Residual Independence

TEST STATISTIC	VALUE
Durbin-Watson (DW)	2.036

The Durbin-Watson test yielded a statistic of 2.036, which is very close to the ideal value of 2. This indicates that the residuals are not autocorrelated, and therefore the assumption of independence is satisfactorily met.

4.4.2 Regression Model Results

With the underlying assumptions for multiple linear regression satisfied, the analysis proceeded to assess the relationships among the study variables and estimate the predictive effects

of strategic management practices on HIV data utilization. Pearson correlation was first used to explore the direction and strength of bivariate associations, providing insight into how the independent variables relate to one another and to the dependent variable. This was followed by multiple regression analysis to determine the unique and combined contribution of each strategic practice to the outcome, controlling inter-variable correlations.

Table 4.27 presents the Pearson correlation matrix, which illustrates the relationships among the four independent variables and Data Utilization. The correlations with Data Utilization highlight the varying strengths of association.

Table 4.34: Overall Correlation Matrix

Variables	Strategy Formula tion Action	Strategic Leaders hip Offered	Resour ce Allocati on Action	Data Collection Approaches	Data Utilization
Strategy Formulation Action	1	0.64	0.07	0.69	0.86
Strategic Leadership Offered	0.64	1	0.03	0.78	0.73
Resource Allocation Action	0.07	0.03	1	0.08	0.1
Data Collection Approaches	0.69	0.78	0.08	1	0.83
Data Utilization	0.86	0.73	0.1	0.83	1

The intercorrelations among the independent variables provide context for interpreting the multiple regression results. Strategy Formulation Action and Data Collection Approaches are moderately to strongly correlated ($r = 0.69$), as are Strategic Leadership Offered and Data Collection Approaches ($r = 0.78$), and Strategy Formulation Action and Strategic Leadership Offered ($r = 0.64$). These relationships suggest that these practices are interconnected, potentially reflecting coordinated efforts in strategic management. For instance, effective data collection may support strategic planning, while strong leadership may facilitate both. In contrast, Resource Allocation Action exhibits weak correlations with all other variables ($r = 0.03$ – 0.08), indicating its relative independence and suggesting that resource allocation operates distinctly from other

practices. These intercorrelations, particularly the moderate to high values among three predictors, raise considerations of multicollinearity, which the multiple regression analysis accounts for by assessing unique contributions.

The multiple regression analysis examined the collective and individual effects of the four strategic management practices on Data Utilization. This approach provides an understanding of how these practices jointly predict the outcome and which are most influential when controlling for the others.

Table 4.28 reports an R value of 0.83, indicating a strong linear relationship between the set of predictors and Data Utilization.

Table 4.35: Overall Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.83	0.69	0.69	0.41

The R-squared value of 0.69 suggests that 69% of the variance in Data Utilization is explained by the combined influence of Strategy Formulation Action, Strategic Leadership Offered, Resource Allocation Action, and Data Collection Approaches. This substantial explanatory power highlights the importance of these practices in driving data-driven decision-making. The adjusted R-squared, also 0.69, confirms the model's robustness, as it accounts for the inclusion of four predictors without significant overfitting. The standard error of the estimate (0.41) indicates moderate residual variability, suggesting that while the model captures a significant portion of the variance, other factors may contribute to the remaining 31% of unexplained variance.

The analysis of variance (ANOVA) provides a critical evaluation of the overall significance of this model, determining whether the set of predictors explains a significant portion of the variance in Data Utilization. Table 4.29 (ANOVA) evaluates the overall significance of the regression model, detailing the contributions of each predictor.

Table 4.36: ANOVA for Regression of Data Utilization on Data Collection Approaches

Source	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Strategy Formulation Action	1	112.5	112.5	1386.39	<0.001

Strategic Leadership Offered	1	8.42	8.42	103.75	<0.001
Resource Allocation Action	1	0.27	0.27	3.31	0.07
Data Collection Approaches	1	8.39	8.39	103.45	<0.001
Residuals	268	21.75	0.08		

The ANOVA results reveal the model's robustness through the F-statistic and its associated p-value. For Strategy Formulation Action, the F-value is 1386.39, with a p-value less than 0.001, indicating a highly significant contribution to the model when considered in the regression framework. This suggests that the inclusion of Strategy Formulation Action, which involves inclusive stakeholder engagement and evidence-based planning, substantially enhances the model's ability to predict Data Utilization. Similarly, Strategic Leadership Offered yields an F-value of 103.75, also with a p-value less than 0.001, demonstrating that leadership practices promoting data integration and capacity building significantly contribute to the model's explanatory power. Data Collection Approaches, reflecting reliable and timely data collection processes, produces an F-value of 103.45, with a p-value less than 0.001, further confirming its significant role in the model. In contrast, Resource Allocation Action, which encompasses the distribution of financial, human, and technological resources, has an F-value of 3.31 and a p-value of 0.07, indicating that its contribution to the model is not significant at the conventional 0.05 threshold. Collectively, the ANOVA results confirm that the multiple regression model, encompassing all four strategic management practices, is statistically significant, as the set of predictors explains a substantial portion of the variance in Data Utilization. This supports the assertion of the study that strategic management practices are vital drivers of data-driven public health outcomes.

Building on the understanding that strategic management practices collectively influence the utilization of community-level HIV data for decision-making and program planning in a decentralized health system, the multiple regression analysis further clarifies the unique contribution of each practice to Data Utilization. Table 4.30 (Coefficients) provides detailed insights into the magnitude and significance of each predictor's effect.

Table 4.37: Multivariate Regression Coefficients

Term	Estimate	Std. Error	Beta	t-value	p-value
Intercept	0.4119	0.11		3.63	<0.001
Strategy Formulation Action	0.4944	0.03	0.61	16.34	<0.001
Strategic Leadership Offered	0.0604	0.03	0.07	1.95	0.052
Resource Allocation Action	0.0312	0.03	0.05	1.15	0.249
Data Collection Approaches	0.3719	0.04	0.46	10.17	<0.001

Strategy Formulation Action, which encompasses inclusive stakeholder engagement and evidence-based planning, has a coefficient of 0.49, with a standard error of 0.03, a standardized Beta of 0.61, a t-value of 16.34, and a p-value less than 0.001. This indicates that a one-unit increase in Strategy Formulation Action, while controlling for the other predictors, is associated with a 0.49-unit increase in Data Utilization. The low p-value confirms that this effect is highly significant, suggesting that strategic planning is a cornerstone practice for ensuring that HIV data is effectively applied to policy and programmatic decisions. Strategic Leadership Offered, characterized by fostering data integration and capacity building, has a coefficient of 0.06, with a standard error of 0.03, a standardized Beta of 0.07, a t-value of 1.95, and a p-value of 0.052. This suggests that a one-unit increase in Strategic Leadership Offered is associated with a modest 0.06-unit increase in Data Utilization, holding other predictors constant. This implies that leadership practices, while potentially supportive, do not exert a strong unique influence on data utilization when considered alongside other strategic management practices, possibly due to overlap with planning or data collection efforts.

Resource Allocation Action, which involves the distribution of financial, human, and technological resources, has a coefficient of 0.03, with a standard error of 0.03, a standardized Beta of 0.05, a t-value of 1.15, and a p-value of 0.249. This indicates that a one-unit increase in Resource Allocation Action is associated with a negligible 0.03-unit increase in Data Utilization, and the low standardized Beta of 0.05 reflects its minimal relative importance. The p-value, well above 0.05, confirms that this effect is not statistically significant, suggesting that resource availability alone does not substantially enhance the utilization of HIV data when controlling for

other predictors. Data Collection Approaches, reflecting reliable, timely, and secure data collection processes, has a coefficient of 0.37, with a standard error of 0.04, a standardized Beta of 0.46, a t-value of 10.17, and a p-value less than 0.001. This indicates that a one-unit increase in Data Collection Approaches, while holding other predictors constant, is associated with a 0.37-unit increase in Data Utilization. This suggests that ensuring high-quality, accessible, and trustworthy HIV data is essential for its effective application in public health interventions.

The findings highlight that Strategy Formulation Action and Data Collection Approaches are the most critical practices for enhancing the utilization of community-level HIV data. Health authorities should prioritize inclusive strategic planning, involving stakeholders and integrating data into clear, measurable objectives, to ensure that HIV data informs policy and programs effectively. Similarly, investments in robust data collection systems, including technology for secure data management and training for data accuracy, are essential to provide reliable and timely data that decision-makers can trust. While Strategic Leadership Offered marginal effect suggests a secondary role, leadership training to foster a data-driven culture could support the stronger predictors. The non-significant effect of Resource Allocation Action indicates that simply increasing resources is insufficient without effective planning and data collection frameworks, suggesting that resources should be allocated strategically to align with data-driven priorities. These insights provide actionable guidance for optimizing data utilization, emphasizing the need for coordinated efforts in planning and data collection to advance public health outcomes in a decentralized health system.

4.4.3 Empirical Decisions on Study Hypotheses

The study proposed four null hypotheses corresponding to the four strategic management practices examined. Multiple regression analysis generated standardized beta coefficients and p - values that provide the statistical basis for accepting or rejecting each null hypothesis. A five per cent significance threshold ($\alpha = 0.05$) was adopted. The table below presents a summary of the test results and the decisions reached.

Table 4.38: Decisions on Hypothesis Testing

Hypothesis	Statement of Null Hypothesis (H_0)	Standardized β	p - value	Decision rule	Decision
H ₀₁	Strategy formulation has no significant effect on the utilization of community level HIV data.	0.61	< 0.001	Reject H_0 if $p < 0.05$	H₀₁ Rejected
H ₀₂	Strategic leadership has no significant effect on the utilization of community level HIV data.	0.07	0.052	Do not reject H_0 if $p \geq 0.05$	H₀₂ Not Rejected
H ₀₃	Resource allocation has no significant effect on the utilization of community level HIV data.	0.05	0.249	Do not reject H_0 if $p \geq 0.05$	H₀₃ Not Rejected
H ₀₄	Data collection approaches have no significant effect on the utilization of community level HIV data.	0.46	< 0.001	Reject H_0 if $p < 0.05$	H₀₄ Rejected

From the regression results presented above, two of the four null hypotheses (H₀₁ and H₀₄) were rejected. This implies that strategy formulation and data collection approaches significantly influence the utilization of community-level HIV data. However, the null hypotheses related to strategic leadership and resource allocation were not rejected, indicating that these two variables did not show a statistically significant effect in the context of this study. These findings point to the importance of strengthening planning and data systems, while also highlighting areas where further inquiry may be necessary.

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

The study integrates the empirical findings with the theoretical and empirical literature to provide a comprehensive interpretation of their significance for public health management. Through an analytical discussion structured around the four research questions, it highlights the relationship between strategic management practices and the utilization of community-level HIV data. By anchoring the interpretation in established theories and prior research, the findings highlight the broader implications of the findings and proposes several recommendations for strengthening data-driven decision-making in HIV programming.

5.2 Summary of Main Findings

Patterns emerging from the data revealed distinct differences in how each strategic management practice related to the utilization of HIV data. While all four practices were generally rated positively, their statistical relationships with data use varied in strength and significance. Some practices exhibited direct and robust predictive effects, while others appeared less influential when considered in combination. These variations suggest that not all strategic efforts yield equal returns in terms of data application, and their impact may depend on how well they are operationalized within the existing health system environment

The results demonstrate that strategy formulation played a dominant role in influencing HIV data utilization. With a mean score of 3.67 and a standard deviation of 0.81, the data suggest that respondents moderately affirmed the presence of structured planning processes within their operational settings. The variable showed a remarkably strong correlation with data utilization ($r = 0.86$), the highest among all examined predictors. In the regression model, it yielded a standardized beta coefficient of 0.61, with a highly significant p-value ($p < 0.001$) and a t-statistic of 16.34. These outcomes underscore the centrality of well-defined strategy formulation processes in enhancing the practical use of community-level HIV data in program planning and monitoring.

Strategic leadership exhibited a slightly higher mean score of 3.73 (SD = 0.74), reflecting relatively stronger agreement among respondents on the presence of supportive leadership practices. While bivariate analysis produced a strong correlation with data utilization ($r = 0.73$), this did not translate into statistical significance in the multivariate model. Specifically, the regression yielded a standardized beta of 0.07, a marginal t-statistic of 1.95, and a p-value of 0.052,

just above the conventional threshold for significance. This pattern suggests that although leadership is perceived positively, it may not independently drive data utilization when other strategic factors such as planning and data systems are considered. Its role could therefore be more enabling than determinative in this context.

Among the four predictors, resource allocation registered the lowest overall agreement, with a mean of 3.66 and standard deviation of 0.68. The weak Pearson correlation with data utilization ($r = 0.10$) signaled minimal alignment between perceptions of resourcing and the practical use of HIV data. This finding was further substantiated by regression analysis, which returned a standardized beta coefficient of 0.05, a t-statistic of 1.15, and a p-value of 0.249. These figures confirm that resource allocation did not have a statistically significant effect on the dependent variable. The results suggest that the availability or distribution of resources, in isolation, may not sufficiently explain data use unless strategically aligned with planning and operational processes.

Of all strategic management practices assessed, data collection scored the highest in terms of perceived implementation, with a mean value of 3.84 and a standard deviation of 0.77. The correlation coefficient between data collection and data utilization was also notably high at 0.83, pointing to a strong and consistent association. Regression analysis confirmed the strength of this relationship, reporting a standardized beta of 0.46, a robust t-statistic of 10.17, and a p-value well below 0.001. This indicates that strong data collection mechanisms—particularly those that ensure timely, accurate, and accessible data—make a substantial and independent contribution to how routinely such data are used. In the overall model, data collection emerged as the second most important driver of HIV data utilization after strategy formulation.

5.3 Discussions

Findings from the study reveal that strategic management practices significantly influence how community-level HIV data is utilized in Kiambu County. Strategy formulation and data collection approaches emerged as the most consistent predictors of effective data use, aligning with previous evidence from decentralized health systems. The influence of strategic leadership and resource allocation was present but less pronounced, reflecting contextual limitations such as inconsistent supervision and funding gaps. These insights affirm the relevance of both internal organizational capacities and localized implementation dynamics in shaping data-driven health decision-making.

5.3.1 Strategy Formulation Action and Data Utilization

Strategic leadership was found to have a moderate but statistically significant relationship with HIV data utilization. This supports theoretical insights from the RBV, which emphasize the enabling role of leadership in aligning human and knowledge resources with organizational objectives. The finding also reflects empirical observations by Aarons et al. (2017) and Muthee et al. (2018), who argue that strong leadership enhances the use of data for program improvement, particularly in decentralized contexts. However, in contrast to ideal models of distributed leadership, the study's complementary qualitative findings and literature by Odhiambo et al. (2020) indicate that leadership within Kenya's health system remains vertically fragmented and inconsistently applied. While strategic direction may be articulated at higher levels, the lack of embedded communication, mentorship, and accountability systems limits its influence at the frontline. Okello et al. (2021) emphasize the need for institutionalized leadership pipelines and feedback loops to reinforce data culture, elements that appeared underdeveloped in the study setting. Thus, while leadership plays a role in guiding vision and mobilizing data resources, its impact on utilization is dependent on the strength of systems that operationalize and reinforce leadership practices across all tiers of health governance.

5.3.2 Strategic Leadership Offered and Data Utilization

Quantitative analysis revealed that resource allocation had a statistically weak association with the utilization of HIV data. This outcome diverges from studies such as Bhattacharya et al. (2019) and Guthrie et al. (2017), which posit that predictable and needs-based funding enhances data infrastructure and use. The weak predictive power in this study may be attributed to the conditional and fragmented nature of resource flows in the study context, as suggested by qualitative insights and echoed in the literature by Ettorchi-Tardy et al. (2012). While RBV theory posits that tangible resources are a foundation for competitive advantage, their value is contingent on alignment with strategic goals and internal absorptive capacity. The Realist Review lens reinforces that financial inputs only activate desired mechanisms when implemented within supportive institutional contexts. This study therefore supports the argument that resource volume alone is insufficient; it is the consistency, timeliness, and decentralization of resources that enable sustained data utilization. The findings suggest that future investments in HIV programming should prioritize not only the quantum of funding but also structural reforms that ensure local-level control and planning flexibility.

5.3.3 Resource Allocation Action and Data Utilization

Quantitative analysis revealed that resource allocation had a statistically weak association with the utilization of HIV data. This outcome diverges from studies such as Bhattacharya et al. (2019) and Guthrie et al. (2017), which posit that predictable and needs-based funding enhances data infrastructure and use. The weak predictive power in this study may be attributed to the conditional and fragmented nature of resource flows in the study context, as suggested by qualitative insights and echoed in the literature by Ettorchi-Tardy et al. (2012). While RBV theory posits that tangible resources are a foundation for competitive advantage, their value is contingent on alignment with strategic goals and internal absorptive capacity. This study therefore supports the argument that resource volume alone is insufficient; it is the consistency, timeliness, and decentralization of resources that enable sustained data utilization. The findings suggest that future investments in HIV programming should prioritize not only the quantum of funding but also structural reforms that ensure local-level control and planning flexibility.

5.3.4 Data Collection Approaches and Data Utilization

Data collection systems were the most statistically significant predictor of community-level HIV data utilization in this study. This confirms findings by Mpofu et al. (2020) and Kang'a et al. (2019), who argue that strong data infrastructure is central to evidence-based health programming. The study supports the assertion that operational aspects—such as the availability of standardized tools, regular supervision, and timely reporting—are instrumental in enhancing data reliability and use. The RBV reinforces this by recognizing routine capabilities as essential to converting data assets into strategic outcomes. From a Realist standpoint, data systems act as a proximal mechanism through which broader strategies are realized at the point of service delivery. The results also align with observations by Zhu et al. (2019), who note that infrastructural gaps and poor validation systems undermine health system responsiveness. In the Kiambu context, the robustness of data collection was directly associated with the degree of utilization, suggesting that technical investments in systems, if well supported, can have immediate and scalable effects on data use. This underscores the need for sustained policy attention on data quality assurance, digital innovation, and human capacity strengthening as key levers for improving HIV program performance.

5.4 Conclusions

This study set out to explore how strategic management practices influence the utilization of HIV data at the community level within a decentralized health system. The findings confirm that strategic planning and operational data systems serve as the most consistent enablers of data use. Where health teams are supported by well-articulated strategies and reliable data infrastructure, they are better equipped to interpret, apply, and act upon health information in real time. Planning emerges not simply as an administrative task, but as a mechanism for aligning actors around shared goals and ensuring that data flows into the heart of service delivery. In addition, the strength of data systems reflects the health system's capacity to institutionalize accountability and support learning across different tiers. Together, these practices underscore the importance of embedding strategic clarity and data reliability within the operational routines of public health programs.

However, the influence of leadership and resourcing appeared more conditional and dependent on contextual and institutional dynamics. Leadership, while generally acknowledged as important, tended to be reactive rather than embedded in routine decision-making structures. Similarly, resource availability did not translate into improved data use unless it was delivered predictably and aligned with actual needs at the point of service. These patterns suggest that strategic management is not only about formulating plans or providing inputs, but also about cultivating systems that enable consistent, localized, and responsive implementation. For counties seeking to enhance the value of HIV data, the study highlights the need for a shift toward integrated management approaches that connect strategic intent with day-to-day realities. Strengthening this linkage is essential for closing the gap between data availability and meaningful, evidence-informed action in decentralized health systems.

5.5 Recommendations

Based on the study's findings, several actionable recommendations were proposed to enhance the utilization of community-level HIV data in Kiambu County. Strengthening strategy formulation processes through inclusive planning and clear communication can improve alignment between data and decision-making. Investments in leadership development, resource mobilization, and digital infrastructure are necessary to support data-driven practices at the community level. Implementing these strategies will help close the gap between data availability and its meaningful use in HIV programming.

5.5.1 Policy Recommendations

There is a critical need for policy-level reforms that strengthen the institutional frameworks guiding strategic management practices within Kenya's decentralized health system. National health policy actors, including the Ministry of Health and NSDCC, should develop clear directives that mandate localized strategic planning processes. These should be accompanied by practical guidance on stakeholder engagement, integration of community-level data, and mechanisms for translating national strategies into operational realities at the county level. Furthermore, there is a strong policy case for embedding routine data use into national M&E frameworks, with explicit expectations and incentives for counties that demonstrate consistent application of data in program design, review, and resource prioritization.

Equally important is the reform of public financing policies to address delays and rigidity in resource flows, which currently undermine data-driven planning. The National Treasury and County Finance Offices should explore reforms that allow for timely and decentralized disbursement of HIV-related operational funds. Policy provisions should also support the institutionalization of structured leadership development programs targeting health managers and sub-county focal persons. These reforms would strengthen leadership accountability and ensure that planning and data use are championed by empowered and well-supported personnel across all levels of the health system.

5.5.2 Practice Recommendations

At the implementation level, counties should prioritize the operationalization of strategic planning through simplified, context-responsive toolkits that can be used by sub-county and facility-level teams. These toolkits should provide step-by-step guidance for setting local targets, aligning budgets to data trends, and fostering inclusive decision-making. In addition, county health departments should institutionalize routine peer learning and data review forums, bringing together community health focal persons, facility in-charges, and SCHMTs to analyze data and co-develop timely program responses. This will cultivate a culture of accountability and continuous improvement in data use practices.

Further, counties should invest in supportive structures that enable consistent leadership and data system performance. This includes embedding coaching and supervision roles within the HR frameworks to empower middle-level health managers and create sustained mentorship pipelines. Donors, partners and development agencies should also support counties in strengthening data infrastructure through provision of digital tools, airtime, transport for

supervision, and data visualization training. Such investments will enhance the reliability and timeliness of routine data while reinforcing its practical application in community-level HIV programming.

5.6 Areas for Further Research

Building on the study's focus on strategic management practices and their influence on HIV data utilization within Kiambu County, further research could benefit from a longitudinal design to trace how the impact of planning, leadership, resource allocation, and data systems unfolds over time, particularly as counties adopt new health policies or transition between donor funding cycles. This would overcome the limitations of the current cross-sectional approach by capturing the dynamic nature of strategic influence and offering deeper insight into causal pathways. Second, given the study's limited exploration of digital health technologies, future investigations should examine how strategic readiness, infrastructural capacity, and digital literacy affect the integration of electronic data systems into routine practice. Such research would illuminate the conditions under which digital tools strengthen data use and inform county-level strategies for digital transformation. Lastly, comparative studies across counties with diverse institutional capacities, funding arrangements, or geographical constraints could reveal how contextual factors shape the effectiveness of strategic management in health systems. This would allow for a more generalizable understanding of what works, where, and why and ultimately guide more tailored policy and implementation responses.

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APPENDICES

Appendix I: Introduction Letter

Irene Akoth Gomba

Africa Nazarene University

January 28, 2025.

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: INTRODUCTORY LETTER - RESEARCH PROJECT

As a postgraduate student enrolled in the Master of Business Administration (MBA) program at Africa Nazarene University, I am conducting research for my thesis titled *"Effect of Strategic Management Practices on the Utilization of Community-Level HIV Data in Kiambu County, Kenya."* I have successfully completed all the required coursework for this degree and am now in the data collection phase of my study.

To achieve the objectives of this study, I kindly request your participation in completing the attached questionnaire. Your input is invaluable in providing insights that will contribute significantly to the findings of this research. Please be assured that all the information you provide will be treated with strict confidentiality and used solely for academic purposes.

I deeply appreciate your time and support in making this study a success. Your cooperation will greatly contribute to advancing knowledge in this critical area of health systems management.

Thank you for your assistance.

Yours sincerely,

Irene Akoth Gomba

Appendix II: Questionnaire**SECTION A: DEMOGRAPHIC INFORMATION**

1. Gender:
 - Male
 - Female
2. Age (in years):
 - Below 25
 - 25-34
 - 35-44
 - 45 and above
3. Level of Education:
 - Certificate/Diploma
 - Bachelor's Degree
 - Master's Degree
 - Doctorate
4. Years of Experience in Current Role:
 - Less than 1 year
 - 1-3 years
 - 4-7 years
 - More than 7 years
5. Training in HIV Data Management
 - Yes, formally trained
 - Yes, informally trained
 - No training received
6. Access to Data Management Tools/Systems
 - Adequate and functional
 - Somewhat adequate
 - Inadequate or unavailable

SECTION B: STRATEGY FORMULATION ACTION

Using a scale of 1-5, where 1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree, please indicate the extent to which you agree with the following statements.

Statements	1	2	3	4	5
1. Stakeholders, including health workers, policymakers, and community representatives, are engaged in discussions and decision-making processes during the formulation of HIV strategies.					
2. The objectives outlined in HIV strategic plans are clearly defined, measurable, and provide specific guidance for program implementation and decision-making.					
3. HIV strategic plans are effectively communicated to all relevant stakeholders, including national, county, and community-level health practitioners, to ensure awareness and alignment.					
4. Community-level HIV data is systematically considered in the development of policies and strategic plans to inform decisions on interventions, resource allocation, and program priorities.					
5. The implementation of HIV strategic plans at different levels of the health system is aligned with the goals and priorities established in the planning process and reflects evidence-based approaches.					

6. What additional steps should be taken to ensure stakeholder involvement in strategy formulation for HIV data utilization in Kiambu County?

SECTION C: STRATEGIC LEADERSHIP OFFERED

Using a scale of 1-5, where 1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree, please indicate the extent to which you agree with the following statements.

Statements	1	2	3	4	5
1. Leadership within the health system promotes the use of community-level HIV data by integrating data insights into decision-making, planning, and policy development					

2. HIV-related policies, strategic goals, and data-driven initiatives are communicated effectively across various levels of the health system to facilitate implementation and alignment					
3. Leadership supports ongoing training, mentorship, and professional development programs aimed at strengthening the capacity of healthcare workers in HIV data collection, management, and utilization					
4. The use of HIV data informs decision-making on the planning and distribution of resources, ensuring that interventions and services are guided by data insights					
5. Leadership periodically reviews and updates HIV strategies and interventions based on new or emerging community-level data to enhance program effectiveness					

6. In your opinion, how can leadership practices be strengthened to enhance the integration of HIV data into health planning and execution?

SECTION D: RESOURCE ALLOCATION ACTION

Using a scale of 1-5, where 1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree, please indicate the extent to which you agree with the following statements.

Statements	1	2	3	4	5
1. Financial resources are allocated for HIV data collection, management, and reporting to support evidence-based decision-making and program planning.					
2. The availability of skilled personnel, including data managers and health professionals, is sufficient to ensure that community-level HIV data is collected, analyzed, and applied effectively.					

3. Technological systems such as digital health records, data management platforms, and electronic reporting tools are used to facilitate HIV data collection and utilization at different levels of the health system.					
4. Decisions regarding the distribution of resources for HIV programs, including funding, personnel, and infrastructure, are based on data and identified community needs.					
5. Investments in infrastructure and technology, such as internet connectivity, data storage systems, and mobile health applications, support the collection, security, and timely sharing of HIV data.					

6. What resource allocation strategies would you recommend to improve the management and utilization of HIV data in Kiambu County?

SECTION E: DATA COLLECTION APPROACHES

Using a scale of 1-5, where 1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree, please indicate the extent to which you agree with the following statements.

Statements	1	2	3	4	5
1. Healthcare providers, decision-makers, and program managers have reliable and timely access to community-level HIV data for planning and intervention design.					
2. The implementation of security and confidentiality measures influences the extent to which HIV data is trusted, accessed, and utilized in program planning and decision-making.					
3. HIV data is collected and submitted within established reporting deadlines to enable timely decision-making, program adjustments, and resource allocation.					
4. The data collection process ensures that the information gathered is complete, accurate, and representative of the HIV burden in different communities.					

5. Regular audits, reviews, and data quality assessments are conducted to verify the accuracy, reliability, and consistency of reported HIV data before it is used in decision-making.					
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6. What improvements would you suggest to strengthen HIV data collection processes in Kiambu County?

SECTION F: UTILIZATION OF COMMUNITY-LEVEL HIV DATA

Using a scale of 1-5, where 1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree, please indicate the extent to which you agree with the following statements.

Statements	1	2	3	4	5
1. Regular audits, reviews, and data quality assessments are conducted to verify the accuracy, reliability, and consistency of reported HIV data before it is used in decision-making.					
2. Healthcare providers, decision-makers, and program managers have reliable and timely access to community-level HIV data for planning and intervention design					
3. Systems and protocols are in place to ensure that community-level HIV data is protected, with clear guidelines on confidentiality, data security, and ethical considerations					
4. HIV data is collected and submitted within established reporting deadlines to enable timely decision-making, program adjustments, and resource allocation					
5. The data collection process ensures that the information gathered is complete, accurate, and representative of the HIV burden in different communities					

6. What strategies do you think would enhance the effective use of community-level HIV data in health programming and decision-making?

Thank You!!

Appendix III: Interview Guide

Title:

Effect of Strategic Management Practices on the Utilization of Community-Level HIV Data in Kiambu County, Kenya

Objective:

The interview seeks to gather in-depth insights on the strategic management practices influencing the utilization of community-level HIV data in Kiambu County.

Interview Questions

1. Strategy Formulation Action

- i. How are stakeholders, including community members and healthcare providers, involved in the formulation of strategies for HIV data utilization in Kiambu County?
- ii. In your experience, how clear and specific are the strategic objectives set for utilizing community-level HIV data in health programming?
- iii. What challenges or barriers have you observed in adapting and cascading strategic frameworks from the national level to the county level?

2. Strategic Leadership Offered

- iv. How would you describe the level of commitment by county leadership to integrating HIV data into decision-making processes?
- v. What communication strategies are used by leaders to share the vision and goals for HIV data-driven interventions, and how effective are they?
- vi. Can you provide examples of how leadership has fostered a culture of continuous learning and improvement in the utilization of HIV data?

3. Resource Allocation Action

- vii. How sufficient are the financial resources allocated to support the collection, analysis, and use of HIV data in Kiambu County?

- viii.** Are there enough skilled personnel to manage and utilize community-level HIV data effectively? What gaps, if any, exist?
- ix.** How has the investment in technology and infrastructure, such as data management systems, supported the utilization of HIV data?

4. Data Collection Approaches

- x.** How standardized and consistent are the tools and procedures used for HIV data collection across the county?
- xi.** What mechanisms are in place to ensure the accuracy, completeness, and timeliness of community-level HIV data?

5. Utilization of Community-Level HIV Data

- xii.** How is community-level HIV data currently being utilized in decision-making, program planning, and resource allocation within the county?
- xiii.** In your opinion, what can be done to improve the integration of community-level HIV data into health interventions and policy formulation?

Appendix IV: Research Authorization



29th January 2025

E-mail: researchwriting.mba.anu@gmail.com

Tel. 0202711213

*Our Ref:*17J03EMBA017

The Director.

National Commission for Science,
Technology and Innovation (NACOSTI),
P. O. Box 30623, 00100
Nairobi. Kenya

Dear Sir/Madam:

RE: RESEARCH AUTHORIZATION FOR: IRENE AKOTH GOMBA

Miss. Irene is a postgraduate student at Africa Nazarene University in the Master of Business Administration (MBA) program.

In order to complete her program, Miss. Irene is conducting research entitled: ‘ **Effect of Strategic Management Practices on the Utilization of Community-Level HIV Data in Kiambu County, Kenya**’

Any assistance offered to her will be highly appreciated.

Yours Faithfully,

DR. Kimani Gichuhi,
MBA, Coordinator,
School of Business,
Africa Nazarene University.

Appendix V: NACOSTI Permit

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 527225	Date of Issue: 03/February/2025
RESEARCH LICENSE	
	
This is to Certify that Miss. IRENE Akoth Gomba of Africa Nazarene University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kiambu on the topic: Effect of Strategic Management Practices on the Utilization of Community-Level HIV Data in Kiambu County, Kenya for the period ending : 03/February/2026.	
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See overleaf for conditions	

Appendix VI: Map of Kiambu County

